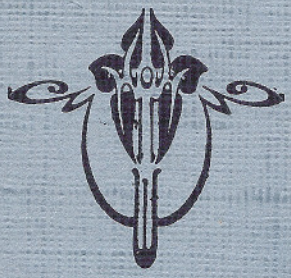
NELSON WATER SUPPLY

BY

JOE BATES

Reprinted from the "Nelson Leader"



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JOE BATES.

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1926.

AFFORESTATION—NARROWGATES NURSERY.

HIS WORSHIP THE MAYOR
(Councillor J. H. S. Aitken).

FOREWORD.

The fourteen articles on " Nelson Water Supply " contained in this little book have previously been published in various issues of the " Nelson Leader." Part xv. is an extra. In this collected form they are most respectfully dedicated to His Worship the Mayor of Nelson, Councillor James H. S. Aitken, Esq., J.P., C.C., who during the period of their publication, and up to the time of his elevation to the mayoral chair, was Chairman of the Water and Baths Committee.

It was hoped to have had this foreword written by the late Councillor Frank Roberts, Councillor Aitken's successor to the Water and Baths chairmanship, but his sudden and regretted death prevented it.

The articles as they appeared in the " Nelson Leader " aroused much interest among the general public, and it is largely due to public demand that they are now reprinted in this limited edition.

The task of writing the articles has been to me one of great pleasure. Of myself I could have done very little; but the ready help of Mr. J. A. Rodwell, A.M. Inst., C.E., the Water Engineer, made my work very light indeed.

He gave me much of his valuable time; he secured for me interviews with His Worship the Mayor (Councillor J. H. S. Aitken) then Chairman of the Water and Baths Committee; Chas. E. Newton, Esq., J.P., M.Inst., C.E., Consulting Engineer to the Borough of Nelson; J. S. Corbett, Esq., Secretary of the English Forestry Association; A. R. Lawson, Esq., who is in charge of the Afforestation Scheme, and F. Wilkinson, Esq., the Baths Manager.

Mr. Rodwell personally conducted me round the various reservoirs, explained their formation and plant in detail, and by the way pointed out many objects of natural beauty and archeological interest that would have escaped my notice.

I have endeavoured to present the information collected in as concise and readable a form as my literary abilities could command, and I trust that the contents of this book will prove a stimulus to greater effort to all who have the good of the town of Nelson at heart; an example of which His Worship the Mayor most worthily sets.

JOE BATES.

BRIERFIELD.

JULY 19TH, 1926.

NELSON WATER SUPPLY.

"Stooping, I lifted the water in the hollow of my hand—carefully, lest the sand might be disturbed—and the sunlight gleamed on it as it slipped through my fingers. Alone in the green-roofed cave, alone with the sunlight and the pure water, there was a sense of something more than these. The water was more to me than water, and the sun than sun. The gleaming rays on the water in my palm held me for a moment, the touch of the water gave me something from itself. A moment and the gleam was gone, the water flowing away, but I had had them.

"Beside the physical water and physical light I had received from them their beauty; they had communicated to me this silent mystery.

"The pure and beautiful water, the pure, clear, and beautiful light, each had given me something of their truth."

R. JEFFERIES.

When Mr. Rodwell acceded to my request for an interview I went prepared to sit at his feet in due meekness, collect big figures, listen to interesting statements, and perhaps discover a few things that would prove of interest to the public of Nelson and district.

I met with surprise after surprise. I soon discovered that I should have to take an interest not only in reservoirs, service mains, by-washes, catchments, filters, drainage areas, floodwater and catchways, but that my survey would also include wide moorlands, deep cloughs, old farms, older halls, mural inscriptions and decorations, family history, straying sheep and cattle, dry walling, afforestation, and a host of other minutea of technical interest and public concern. I am hoping we may, before our tour finishes, capture a ghost; certain it is we shall meet with many a real Lancashire witch. They are not yet extinct.

We are apt to think that we get our domestic water from Ogden and Coldwell reservoirs. The water we drink, use for our bath, swill the flags with, and use for a thousand other purposes is only collected and stored in those places and distributed from there to the scores of thousands of domestic taps.

Let us follow a drop of water, learn where it comes from, and go with it on its travels until it finally settles into its place in Ogden No. 1 reservoir.

Away out over the Irish Sea a thin faint mist is rising and obscuring the sun; as it rises it drifts, and the westerly wind bears it gently towards the Lancashire coast. As it drifts it forms into a series of clouds, one following another like boys at their games, at an altitude of about fifteen hundred feet. As those clouds drift landwards some of them float over Morecambe Bay, are caught by a current of wind drifting east, and with it travel silently and steadily towards Pendle.

The chill breeze and the cold upper strata of air condense those clouds of fine mist and they form into rain.

One particular drop we see falls upon a blade of grass near to the summit of Pendle; in alighting it shakes that emerald blade; it slides down from the tip to the base of the blade, rests a moment and then, like a polished pearl, glides down the green column of the stalk to the root.

At the root it touches brown peat, discovers a tiny crack, enters it and passes forwards and downwards until it meets a trickle of water coming from another direction.

The drop and the trickle join, and winding their way under dark and subterranean passages emerge at last into broad daylight at some place where bracken spreads abroad its wing-like fronds, heather purples the bank and perfumes the air, and moss, green as the deep sea, and soft as the eider duck's down, covers the sides of brown grit boulders. On goes our drop of water; it glints in the sunlight; it raises its tiny, tinkling voice and helps swell the full chorus of the stream; it drops from stone to stone, plays with the bubbles in the pool, falls over the lips of broken rocks into tiny whirlpools, lingers about the golden pebbles and aureate grains of sand, pushes here, rushes there, dallying with bending blade and tapering spire of rush, hiding under rock ledge, feeling the breeze ruffle its pellucid rotundity, resting for a whole hour here, an hour yonder, until daylight fades, dusk creeps down the steep hill sides, the stars peep out, the moon rises, and the drop of water that by day and in the sunlight was a diamond flawless and unsullied is now, under the witching spell of midnight's moon, a yellow, translucent pearl, chaste as snow that has never known daylight, clean as the eye of a laughing child and pure as the light that glows from the evening star in May.

Finally our drop of water, sea born, wind driven, cloud conveyed, grass tinctured, stream-carried enters the great holder that lies between the rocky knees of Spence Moor and Buttock.

And what a sight the countless millions of drops make, that rest for a time in that vast holder beneath the little hills at the feet of Pendle.

Had you seen that sheet of water as often as I have, you would have seen it on louring days black as an ouzel's wing; you would have beheld it on windy days fringed with silvery lace as the gusts drave the waves dashing against the high stone embankment; you would, on calm mornings have seen its surface placid as a mirror and noted the wild duck floating on it; you would, in the high noontide of a summer's day, have seen it blue as the sky o'erhead, or gleaming with

silver delicate as a dragon fly's wing when the moon at midnight rest upon it.

This water we drink is a wonderful beverage. It is brewed in heaven above and stored in the chambers of earth beneath. It is of a vintage unsurpassed. It is of a purity unblemished. It needs no label. It needs no bush to advertise its quality. It needs no praise.

There is none other beverage on earth its peer. It is health itself. It is a gift exceeding precious. It is our very life.

It has been maturing from of old, when the world was void and without form. It is older than the earth and the solid rocks.

It is the only natural element for slaking the thirst of animal and man; all other beverages are largely made up of it, and are often an insult to it. Without it humanity would perish from off the face of the earth in a few days. It is the lost wanderer's salvation in a desert land. In it we are washed at birth: in water the christian is baptized, and, when death has closed our eyes in long, long sleep, with water we are finally bathed.

Water is something more than a liquid. It contains some element of the divine. It is a gift from God.

As a town Nelson is well placed in regard to its water supply. It's gathering grounds and reservoirs are practially on the hem of its boundaries. The hills that called the precious fluid are the intimate hills we have known and rambled over from childhood; the streams that lead the water dancing down are silvery as mercury, lively as a busy bee, various as a whimsical maid, musical as an April throstle, charming as a spray of wild roses.

Nelson possesses seven reservoirs. These holders do not look after themselves as do natural lakes; they did not make themselves. They are man made and require man's constant care and supervision.

At the head of this important communal undertaking is John Arthur Rodwell, who has held his present position under the Nelson Town Council since May, 1924. He followed the late lamented Mr. Smith Whitehead, whose early death the whole town deplored.

Mr. Rodwell, who is quite a young man, hails from the lovely Wensleydale district of Yorkshire. He studied at Skipton Grammar School, and later at Leeds University. The subjects he specialised in were civil and mechanical engineering, geology and surveying.

Before coming to Nelson Mr. Rodwell gained practical experience under various water authorities at other towns. He served as clerk of works, under his father, for the Glusburn Sewage Works and other places.

From there he went to Leeds as assistant to Messrs. Spink, Pilling and Rodwell, consulting engineers.

Leaving Leeds he went to Dewsbury as engineering assistant to the Dewsbury Borough Council and the Dewsbury and Heckmondwike Water Board. These two bodies were interrelated. In this appointment Mr. Rodwell was engaged on sewage outfall work and reservoir work generally. An engagement at Belfast next claimed him. He served the Belfast City and District Water Commissioners in connection with the Mourne Mountains Reservoir Schemes. His commission with that body completed, he obtained a post under the Durham County Water Works, a large public undertaking.

Previously this Water Board was a private undertaking that had charge of a number of reservoirs, supplying an area of over 400 square miles with a population of 450,000. The whole of this large and important undertaking eventually became the property of the Durham County Water Board.

Mr. Rodwell vacated his post with this body to take up the important duties offered to him by the Nelson Borough Council.

In those years of training Mr. Rodwell had been acquiring knowledge at first hand. He was learning on the spot how to discharge his duties, collect information of an eminently practical nature, gather knowledge of the class of men whom he would have in later years to control and direct, and learn by rubbing shoulders against the hard facts of life how best to place his accumulated knowledge to the public good.

Something in his manner told me that he had had other experiences of life; that at one period he had lived under vastly different conditions from what he ordinarily enjoys. So I put a few questions to him on this point, and jotted down his answers.

"During the period 1914—1918, did you 'do your bit' and serve your King and country in any capacity, naval or military, Mr. Rodwell?"

"I joined up with the Royal Marines, serving both in England and France. I acted as technical officer whilst in the Royal Marines, and later as demobilisation officer to the Royal Marine Engineers. When I left the navy I went back to the Durham County Water Board, and served them up to coming to Nelson."

That, in a nutshell, is the history of the Borough of Nelson's Waterworks Engineer. It reads very matter of fact and prosaic, but those who can read between the lines will discover a young man whose life has been packed tight with study, endeavour, adventure, and who yet finds in the discharge of his daily duties the moral consolation of work well done.

I found Mr. Rodwell extremely anxious to place information of a general and non-technical nature before "Leader" readers. His main reason for this is to encourage in the minds of Nelson and district ratepayers a deeper interest in matters that relate to the communal welfare of the town.

The town's water supply belongs to the ratepayers of the borough. It is theirs as much are the clothes they wear, the food they eat, the sunshine they enjoy, the streets they walk along.

All who use water and pay rates are partners in this vast municipal undertaking. It is to their interest to be concerned in this and all the borough's business, to learn of the town's progress and enterprise, and of all the businesses in which the go-ahead Borough of Nelson is engaged is none of more vital importance than that of its water supply.

From the general we settled down to the particular. I asked many questions, to each of which Mr. Rodwell gave interesting and ready answers.

"How many reservoirs are there belonging to the borough of Nelson, Mr. Rodwell?"

"Seven. I will give you the names of them, and, would you care to jot down their capacity?"

"I would, indeed. Of course I'm not to an odd half gill more or less."

"At Ogden we have two impounding reservoirs. These two have a storage capacity of over 200 million gallons of water.

"Coldwell is an impounding reservoir with an 80 millions gallon capacity.

"The two Black Moss reservoirs are compensation supplies, and between them hold 10 million gallons.

"The one at Walverden, holding 25 million gallons, is purely compensation water.

"That at Waids House Road as a small balancing reservoir for the town. It holds about a day's supply of water.

"So that altogether Nelson has, for drinking and industrial purposes, a supply of not less than 417 million gallons of water to supply its varied needs when all the reservoirs are full."

"Will water from these reservoirs reach all dwellings that are likely to be erected within the borough boundaries?"

"These reservoirs when constructed were not high enough to reach some of the land within the borough boundaries, and should development of the Marsden Hall and Halifax Road districts be carried much further, it would be impossible to supply houses at so high a level."

"In that case, and in the face of the extensions now being made and contemplated, what provision is being made."

"Mr. Newton and Mr. Whitehead foresaw such likely developments, and included in the 1918 Act provision for the construction of a reservoir in Coldwell valley some 40 to 50 feet higher than the existing reservoirs."

Mr. Rodwell is nothing if not practical, and as he is anxious for "Leader" readers to have matter at first hand he suggested a visit to Coldwell Reservoir. The car was called out, we took our places, we pip-pipped through a maze of streets, to enter an even more bewildering maze of lanes that seemed all loops, angles, corners, bends, steep rises and steeper falls, and the fact that everybody we met we missed proves that Nelson people are quick on their feet and my guide an expert in steering a motor car.

Had the steering of the car been left to me I am afraid our adventures would have proved diverse and exciting. We should never have reached Coldwell, though probably we might, along with our numerous victims, have adorned the wards at Reedyford Hospital. Fortunately we arrived safe and sound in limb, wind and carburetter at our destination, and somewhat of the things we saw and heard will be detailed "in our next."

Whilst Mr. Rodwell was parking the car in the bank side I told him about a ratepayer in Brierfield who groused no end when the last water rate was presented. But that ratepayer grumbled too soon, as an act of retribution proved.

She and her husband spent their midsummer holiday at a lonely farm. This farm was miles from the nearest railway station and umpteen miles from the nearest water tap.

Every drop of water needed on that farm had to be pumped from a deep well and carried a good fifty yards to the kitchen. If the cow, the horse, the pigs, the hens or the humans needed a drink, to the pump and the trough underneath they had to go for satisfaction. The lesson went home, for on her return from her holiday I heard her state in the presence of her husband, that never again would she grumble at the water rate, no matter how much it was.

This is the first of a series of articles on Nelson's sources of water supply. Before they are concluded it is hoped that the "Leader" will be able to show by photographs in its columns how extensive, valuable and all important their water supply is; that on it rests the town's growth, its industry, its health, prosperity and its very life. In moving about from one place to another we shall meet with unusual personalities of whom it is hoped we may be able to present recent photographs or at least reliable pen pictures.

Our investigations will not rest just in reservoirs, water gauges, infiltration and the general staff, but will take us along strange and seldom trodden pathways, into ancient biuldings where estatesmen lived in days long gone by, round about Bouldsworth and Pendle Forest farms, along the fringe of lonely and lovely moors, through all manner of wood, stone, gap, ladder and step-up stiles; into bypaths flowery, leafy, shady and autumn tinted; through meadows sleepy in the September sunlight; away up to hill tops from where we can see near and far hill and vale, moor and mountain, stream and dingle, wood and heathery slope, and all the sweet, quaint, wholesome things that make our country side a delight to behold and fragrant to afterwards remember.

PART II.

COLDWELL RESERVOIR AND NEW HOUSE FARM.

Coldwell reservoir lies high above the slated roofs of Nelson, so high that from the top of the embankment only its loftiest roofs and tallest chimney stacks are visible

This sheet of water reposes on the line that divides the intensively industrial from the primal wild.

Well clear of Nelson, with one's face to the moors, the first thing that strikes the visitor is the tremendous number of stone walls, some high, some low, that twist and wind about in all directions, enclosing field, pasture land, meadow, farm, fold, intake, meadowland reverting to the wild and bounding acres of shaggy moorland and peaty fells from the cultivated areas. There are scores of miles of these walls, mostly made up of rough, ill-shaped, undressed stones. The only walls in this locality made of dressed blocks are the high ones surrounding Coldwell and parts of its enclosures.

Many thousands of tons of rock have gone to their construction, years have been spent in putting them up, and once up are of such enduring nature as to seem to defy time itself almost. They are what are termed "dry walls," which means that neither mortar nor lime has been used in their erection.

How many of these walls keep intact is a marvel. The storms of years beat upon them, pushing hard against their bulk; gale and hurricane strike them with invisible fists, hail beats them with a fusilade of frozen pellets; rain falls and steeps them in its biting moisture, and moorland fog enwraps them in its ghostly folds.

Fifty slow-footed years pass by, and the knee of time pressing against them makes them to lean a little in one place, belly outward in another and sink a trifle up in damp corners.

But they do not fall.

From newness the walls develop a delicate shade of brown, which as time goes on merges into a rich bronze. Fungus grows at their bases, mosses tint them, lichens ring them, ferns grow in the niches, tiny weeds and grass find lodgment on many a ledge. Life comes to these old walls; snails, beetles, mice, spiders, butterflies, moths, a rat, a weasel; starlings rest on them, robins visit them, and the wheatear flips about, bobbing and courtseying and showing the white bar at the base of his tail. And still the old walls keep up.

Their biggest enemy is the wandering, gawmless sheep, who will endeavour to leap it, and, grazing a top stone with its hind feet loosens it. Other sheep follow, the loosened stone drops down, and soon a gap is made.

These old walls have a beauty all their own. In June and July evenings, when the slanting rays of the setting sun fall kindly against the mosses and lichens they take on a tone of sweet tenderness and exhibit purples and browns and occasionally deep rhododendron greens that fascinate and thrill the observing eye.

Coldwell is not a large sheet of water as reservoirs go. It holds only 80 million gallons when full. On the day of our visit it was several feet below its normal level, due to the long spell of dry weather. It is irregular in outline; up in one corner grow a few water reeds and a species of weed I could not get near enough to identify.

Though placed well up the hill side it is in a natural depression, a high bank on the top side walling it in in that sector.

There are fish in—mostly trout—and the water has been leased occasionally to anglers, but this year no permits have been issued.

"What is the large stone building at the foot of the embankment?" I asked Mr. Rodwell, who had led the way from the main road into the reservoir enclosure.

"The filter house, Mr. Bates."

"By what process is the water filtered?" I further queried.

"By a process similar to that at Barley, which I want you to see later on. It consists of four enclosed drum filters, with a full capacity of 25,000 gallons an hour, or nearly three-quarters of a million gallons per day. At night the hourly output is much less."

The quality of Coldwell water is as pure as can be desired for domestic purposes.

On the inflow sides are 400 acres of moorland absolutely free from any kind of animal life, domestic or agricultural, so that it is not possible for any liquid manure or animal refuse to drain into the reservoir.

Once in a while a cow or a sheep may stray on to the catchment ground, but they are there on very short lease, as the moment they are detected they are "shoo'd" off.

On the hill side, to the south of the reservoir, stands Shuttleworth Pasture Farm, where the water bailiff lives. All drainage is diverted from the farm, nor is any stock allowed to be kept thereon.

On the steep banks of the reservoir, and on certain parts of the catchment area, about 12 acres have been planted with trees this year; the varieties include young spruce, larch and fir with a 5 per cent. admixture of hardwoods, beech, oak, ash etc.

On Shuttleworth Pasture Farm about an acre of land is being prepared to serve as a nursery for young trees.

By the end of Shuttleworth Pasture Farm is an old moorland track, a King's highway, a direct road from Haggate to Trawden, which Mr. Rodwell informed me the "Corporation of Nelson are strictly preserving in the interests of ramblers and residents. It has not been in any way diverted from its original lines, and only in this spot has it been altered, and then only to improve its surface by a levelling up and surface covering with clinkers."

As we pottered about Shuttleworth Pasture Farm I ask Mr. Rodwell if ever he had heard

the tale about the school inspector, the country youth and the dry wall.

Learning that he hadn't, I made bold to tell it him.

"An inspector visiting a country school was so interested at the intelligence shown by a class of lads, that to further test their wit and knowledge said he would give sixpence to the first lad who could put a question to him that he could not answer.

"Several questions were put to the visitor and answered.

"At last a youth with a 12½ x 7¾ inches grin put up his hand and asked,

"'Please, sir; con yo' tell me wot so'oart o' mortar they use for dry walling?'

"That floored the inspector, and after thinking a while said, 'Really, my lad, I can't say. What kind do they use?'

"'They durn'd use noa sooart at all, mon.'

"The inspector paid up."

Noticing my gaze fixed on an old house at the moor edge, Mr. Rodwell asked me was I at all interested in ancient buildings.

I answered that I was, that for years I had been collecting them, also mountains, waterfalls, sunsets, snowstorms, full moons and high tides; that at home I had a wonderful set of rainbows gathered in various parts of Pendle Forest, the Yorkshire Dales and the English Lake District.

"That being so," said he, "this one up in the field will certainly interest you."

It looked an old place; it looked as though it had been fixed in its foundations since that memorable day Canute said to the tide:

"Roll back, thou dark and deep blue
ocean, roll."

I had no idea as to the age of the building, nor who in past years had lived and loved within its gritty walls.

It was pleasant walking through the field and meadow paths with our faces to the high, sun burned moors. Away up on the slope of Bouldsworth, to the right of the rain gauge, and full against the skyline, a shepherd was herding sheep. He carried a stick in the crook of his left arm, as a keeper holds his gun. His dog, at a sharp whistle, bounded down the grassy slope, got behind a couple of nibbling sheep and rushed them up to the flock. We could see the collected sheep moving forward along the crest of the hill, the shepherd and his dog behind.

Late swallows were wheeling round hawking for flies; a colony of starlings in a field a hundred yards away, sought industriously for grubs; balancing himself in mid-air was a hovering hawk, and, along the top of the wall we were approaching, a wheatear led the way.

Well to our left two men were busy mowing "fog;" the swathes and cocks of cut grass looked almost black in the elusive September light.

The house we had come to investigate was by now reached. My guide had told me its name, New House Farm, but had purposely kept back certain items of information.

"Why," I exclaimed, "there's a mural tablet over the door, and a lesser one above that."

"Yes," said Mr. Rodwell, "I wanted you to see them."

Considering these mural tablets to be of public interest I wrote down their inscriptions.

The large one immediately over the door bears the following statement in beautifully chiselled letters.

ROBERT PARKER
AND JANE HIS
WIFE ROBERT &
HENRY THEIR S
ONNES BUILT THIS
HOUS MAY 2 1672.

On the smaller tablet immediately above it states:

O THOU OF MIGHTY MOST
BLESSE THEM THAT MADE
THIS COST. R.P. 1672.

This Robert Parker buried his first wife Jane some time after settling at New House Farm, for on a large grit block which acts as keystone to the arch of the granary door, is an inscription stating the following connubial fact:

ROBERT PARKER AND
GRACE HIS WIFE, 1677.

There is engraved in everlasting stone the fact that about the year 1677 he had remarried to a lady name of Grace.

The type of architecture of New House Farm is somewhat similar to that of many of the houses built in Pendle Forest district in the year's 1580 to 1680. But in this case there is one very interesting and striking variation from type, namely, the porch, which we will enter in a few minutes.

At front and back, upstairs and downstairs, are rows of mullion windows, which probably held diamond panes originally. Over the lower windows are dripstones, so common a feature in this quality of house. The mullions are innocent of glazing, nor could I discover any trace of glass inside or outside the house.

The old method of erecting a porch was to attach it to the outside of the building it was intended to serve, to act as a kind of entrance hall, vestibule, rest room, shelter in storm and cool room in hot weather. At New House Farm the porch does not project but is an adaptation of the space between the living room on the left and the dayroom on the right. It is practically twelve feet long, six feet wide and was originally about seven feet high.

On each side is a flagstone seat running the whole length of the porch.

On one side, over the seat, is a recess in which used to be placed the lantern of an evening and probably the beer jug by day.

The door admitting to the porch is of solid oak, but is not, as I had hoped it might be, studded with iron or oaken square headed nails.

The living room is twenty by twenty-one feet, and when in occupation was crossed by

heavy, rough dressed, oak beams of great girth. The beams are gone, but the stone supports on which the ends rested still project from the walls, though they are not in a good state of preservation. This room is lit up by one long row of six windows and one short row of two windows.

The old fireplace was long ago pulled down, and in its place was put up an ugly appliance of the Victorian era, a thing altogether out of harmony with the poetry of the building and out of sympathy with the charm of the room. Happily it is fast rusting away.

Swallows have nested in the chinks in the upper part of the chimney stack. This chimney stack or luvver, is wide, massive, well constructed, almost straight from grate to outlet, and as solid and enduring in construction as the rest of the domicile.

A stone stairway, consisting of three flights of steps, a long, a short, and a long, leads to the bedchambers; the ascent making a half-circle.

There is no floor to either of the bedrooms, there is no under-drawing, and the high roof is held up by heavy longitudinal and transverse beams, rough-tooled with plane or adze.

A doorway on the right leads into the second chamber, which is over the buttery and porch. As previously stated these upper chambers have mullion windows.

The large bedroom is exactly the same size as the large apartment under, and from its glazeless windows may be seen parts of Thursden Valley immediately above Hellscar and Stephen Hey. At the base of the staircase a door opens on to the buttery, which is entered by a short flight of steps. There still remain the stone banking on which the syles rested to cream the milk and the outlet holes through which the "blue milk" drained.

The east end of New House Farm is of more recent date, and in a room facing south east are the remains of an old type of fireplace, a small replica of the one at Wycollar, but in this case over the mantle is a mural plaster cast, about a yard square, containing an interfoliation of oak leaves, twigs and acorns. It has been painted at some time, but the pigment has almost all scaled off, what bit remains has gone black.

There are no name, initials, coat of arms, motto or text to explain or elucidate the significance of the decoration.

It is possible by craning the neck to see daylight out at the top of the chimney.

The water for the house supply was conveyed from hillside springs by open aqueducts to within a few feet of the house itself.

Mr. Rodwell was careful to point them out to me.

We looked round at the back of the house, discovered a deep depression, inspected it and found a quantity of big grit stones, but could not lift them up.

Mr. Rodwell is going to look into this matter, and I am hoping that if he discovers "owt ov any vally" that he will allow me to share halves with him. Who knows! there may be boxes full of bullion, caskets crammed with diamonds, gold plate, strings of pearls or an old box full of empty jam jars.

Leaving New House Farm we came down the old lane, and at a certain place, under cover of a dozen or so tall trees, Mr. Rodwell pointed out a tiny cottage.

We went in to inspect it. It is built on the bungalow style, is all "downstairs," and the one room, which is 12 feet by 12, has, in its time served as dining room, drawing room, kitchen, library, bedroom, washhouse, reception hall and garage.

People have lived in this abode, been born in it, died in it and buried from it.

"What will eventually happen to this 'little cottage near a wood' Mr. Rodwell?"

"I regret to say that it has to be done away with. It will be a pity to pull it down, but owing to the rapid growth of the town in the Marsden Hall and Halifax Road districts, some of the newer portions are on ground too high to be supplied by the existing Coldwell reservoir in a dry summer.

"In the 1918 Act provision was made for a small reservoir of some 35 million gallons capacity to be built in this part of the watershed to afford supply to the houses erected on the higher portions of the town."

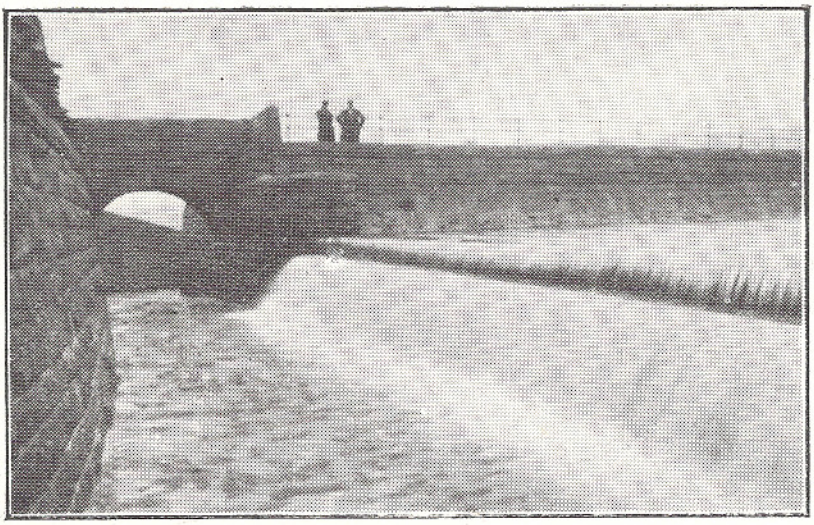
On that dull, hazy September afternoon the aspect from New House Farm was one to chill all but a lover of the open.

To me it was a land of romance; a place without beginning and without end. Earth and sky merged one into the other in whichever direction the eyes gazed. Wide acres of sun-burned grass, rushes and bent lay to the east, great wide patches fawn, grey and russet. Vast stretches of territory, wild, inhospitable, solitary and lonely as untrodden, virgin country.

Except our two selves not a creature moved on the open miles of that spacious moorland.

The shepherd and his dog had gone; the sheep were over the hill; there was nothing only sun-burned tussocks of grass, green-black walls, rolling moorlands, shallow depressions and a spirit of absolute loneliness. Not a bird winged over its eerie solitude, not a wild thing crept about the walls or through the bunches of damp rushes.

And yet enchantment was there. The wide moor called, called to me as the sea calls and the uplifted rocks call; lured as the winding pathway lures to the uplands and the stars in the arching purple heavens beckon; it whispered as the west wind murmurs through the pine trees and swaying grass blades and as water whimples over golden pebbles; it invited as the harvest moon invites in clear September nights, and as the sun invites in dewy morns of May whilst the throstle chants his song of love.



BYE-WASH AT LOWER OGDEN RESERVOIR.

PART III.

OGDEN AND BLACK MOSS RESERVOIRS

On our way up to Barley and the Ogden Valley, we chatted about Pendle Forest, its old homesteads, inhabitants, folk lore, and folk ways; we even delved into the mystery of ghosts and wizards, when my guide's attention was drawn to other matters more mundane.

We had got as far as the new bridge near to the Wesleyan Chapel, when Mr. Rodwell said, "We haven't encountered any ghosts yet, Mr. Bates."

"No, we have not," I replied, "though a few moments ago a genuine Pendle Forest witch went by."

Mr. Rodwell cast his eyes up and scanned the heavens, expecting, probably, to see an old, warty-faced woman astride a broomstick, heading towards Pendle.

"No, not one of that sort, Mr .Rodwell. That kind never were. They were but the figment of a diseased imagination, the conjured-up vision of some ugly nightmare; the over-coloured creation of the brains of religious, political, and socially misguided persons."

"Why, what sort of witch was the one you saw?"

"If you had not been busy talking about catchments, valves, and similar hard facts, you would have seen my witch when she passed close to you. Shall I describe her for you?"

"Do please, then I may know one when next time I meet her."

"I have known this Pendle Forest witch since she was a baby in arms. She is not over tall, nor too plump. She walks from the hips with a light free step. Her hair is the colour of ripe wheat at sunset, and is bobbed. She wears the lily on her forehead, and ruddy apples on her cheeks. Her eyes are blue, with just the faintest tinge of grey in them, and they sparkle at times with fun and laughter. Her lips are modestly full, curve slightly upwards at the top, and form dimples. Behind those lips are two rows of teeth that have never known the dentist's forceps, and as even as the figures on a dial, and as white as snowdrop petals. Her ears are delicate as the pink wild rose; her nose, of no really definite type, is the merest trifle tip-tilted; there is a cunning dent in her chin which, round as a peach, stands over a neck as flexible as a willow wand; her bosom, as much of it as is exposed, is chaste as Dian's brow, and sweet as a bouquet of flowers. Her attire is as up-to-date as the dressmaker, and nimble fingers can construct."

"Rather an unusual kind of witch, Mr. Bates."

"No, quite a common sort in this district. They are guilty of a lot of heart-breaking tragedies; they cause young men to write poetry, forsake parents, kindred, and home, and entice them to consult cabinet-makers, house furnishers, dealers in crockery, and the registrar of marriages."

I could have told Mr. Rodwell a lot more about Pendle Forest witches, only by this we had arrived at the embankment of Lower Ogden Reservoir, just in time to see the sun break in glory through the clouds, flood Ogden Clough with mellow airy gold, lay a silver pathway across the broad sheet of water, turn the brown bracken into burning bushes, and scatter as with emeralds, the

fields and meadows that lie between Far Banks and Spence Moor Edge.

Looking up the reservoir, one sees on the right, or north side, a long, curving, masonry-faced storm-water channel, running the full length of the reservoir. It is 12 feet wide at the top, 6 feet at the bottom, and empties flood or storm water at a point where it almost touches the wide weir at the reservoir exit.

By passing storm water along the channel, it obviates the silting up of the reservoir, which would otherwise occur.

In front of the reservoir is a long line of iron pipe rails. The embankment makes a splendid promenade, with the wide water on the top side, and a steep, deep grassy bank on the low side.

At the roadway corner starts the overflow from the weir, which to-day is a beautiful rollicking cascade. Along the embankment is a public footpath, leading to a gate in the boundary wall and forward to Newchurch-in-Pendle.

The valve house is in the castellated building at the end of the two span lattice girder bridge about three quarters way along the embankment. Sixty easy strides brought us to the solid oak, square-studded door, on which are written and carved numerous visitors' names and initials.

Naturally, Mr. Rodwell objects to visitors disfiguring the door with pencil and pen-knife. These are they who blaze tree boles, cut church doors, garden gates, park forms, and scratch windows and mirrors.

The valve house is lined from top to bottom with white glazed bricks. A deep square shaft, a full 120 steps down, is descended by a series of iron ladders from one level to another. The ladder ends rest on platforms composed of small squares of thick glass, encased in stout iron frames, and supported on sturdy steel baulks, thus allowing a fairly free admission of light into the deep well of the shaft.

Down ladder after ladder we went until we were far under the wind-shook waters of the sun-glinting reservoir.

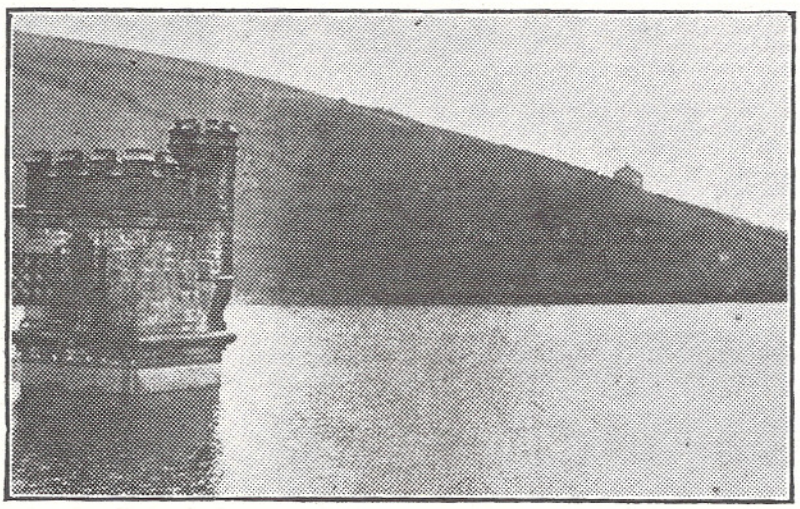
"At alternate platforms," said Mr. Rodwell, "are draw-off valves to draw water off at different levels, according to the height of the reservoir. The central pipe is 18 inches in diameter. This pipe takes water from the draw-off sluices, conveys it to the meter-house, then to the filters, and finally into the town's service supply."

From Lower Ogden, we passed near to Upper Ogden Reservoir, noting the old filter beds, the place where the stone water channel starts, the escaping flood water, and high embankment. Our way lay over the tongue of land connecting Buttock with Barley Hill, to inspect a long cutway running in a direct line, under the lee of the bank facing north, beginning at Under Pendle Farm, and passing Mancknowles Ing to the flat rise behind Wilkinson Farm.

This piece of primitive hydraulic engineering Mr. C. E. Newton had mentioned to Mr. Rodwell, in a letter, advising him to visit the place and verify his, Mr. Newton's, statement.

Unfortunately Mr. Newton had no idea regarding the date of its construction, but he supposed that its original purpose had been to turn a water wheel for the grinding of locally grown wheat.

This particular "cut" was discovered and followed from its starting point to the place where it probably finished just behind Wilkinson Farm.



OGDEN RESERVOIR WITH VALVE TOWER.

Photo : F. Taylor.

That this cutting is not a natural formation the curious investigator may prove for himself by paying a visit to Deep Clough. Half way up the clough in amongst the bracken and the heather is a knot of brown, sharp-edged rocks. Standing under those rocks, and looking down past Under Pendle Farm, it will be noticed that the "piece of hydraulic engineering" referred to by Mr. Newton, runs in as straight a line as is possible, and in a manner that no natural formed water-way could run. Though man made, time and the seasons have been very kind to it, it is covered in in many places by tree and bush; there are magnificent stooks of tall ferns; in the old wall past Mancknowles Ing the wren makes its home, and in the thorn and holly bushes the thrush and the blackbird find shelter in winter and nesting sites in summer.

On our way towards Black Moss we had to pass the old farm mentioned. It is worth a passing glance. Thousands of visitors to Barley pass it; they see it, yet observe it not. It is an old house; its front faces Barley Hill, it claims a sweet little garden enclosed by a wall and hedge; a garden in which grow roses red and roses white; a garden that makes one think about primroses, daffodils, wallflowers, lemon thyme, brandy mint, sage, comfrey and all manner of old-fashioned herbs for healing, and blooms for fragrance and beauty. The walls of this farm are crusted with green of moss and grey of lichen. The roof has been toned and mellowed by sun and rain, moon and frost, wind and dew, hail and snow, until it has become a subdued blend of all the colours that the varying seasons and the passing centuries mean.

There are mullion windows, some have been walled up, but the outlines are still in evidence. A barn-like building extends from the inhabited part to the roadway.

Mr. Newton thinks that this part of Wilkinson Farm has been used at one time for religious purposes. A doorway at one time gave admittance to this building, but long years ago it was walled up. From this walled-up door to the garden gate is a line of willows, forming a shady avenue in summer, and a wind break in winter.

As we turned away from Wilkinson Farm Mr. Rodwell said, "It will be news to you to learn that Mr. Newton has extended his archeological researches to this area, and in this valley in particular he has deeply delved into ancient lore."

"Do you know, Mr. Rodwell, you have mentioned Mr. Newton so often in our chats that you are making me anxious to meet him."

"I have already hinted the matter to him, and all that now remains is to fix the day and time."

"Just at his convenience. I shall now look forward to meeting Mr. Newton, and gleaning from him further information regarding the district and the valley I love so well."

Leaving Barley, we entered the occupation road, which starts close to the post office and Primitives' Chapel, and runs alongside the Black Moss Reservoirs. This is a wild and desolate district. On the right Stangs, bleak and bare and solitary lies couchant, like a tawny lion, with head to Barley village. Walls zig-zag across the broad flanks, swampy places overgrown with rushes and cotton grass lie between road and foot of the moor. Not a tree or bush relieves the smoothness of the long, uncultivated hill side. Sheep nibble the scant grass; an occasional hare ambles along; pewits and starlings find food on the stringy growth; a heron wings over on its way to Foulridge, and seagulls, white of wing, and pink of foot, sail along to the desolation of Pilling Marshes.

On the left of the reservoirs is Overhouses, Foot House Gate, Salt Pie Farm, and Windy Harbour; far up at the valley head is Firbir Farm, and right off that High Wheathead.

On a day like this in the dull, damp light, with leaden clouds drifting swiftly by, and a wind dirging through the grass and rushes, one searches for something offering a sparkle of relief.

Drifted leaves shine brown and wet; a wayside pool gleams like a dulled mirror; the water in the bywash dashes noisily down the steep runway. Behind us is Pendle, slatey blue, cloud and vapour wreathed along the summit. The broad bosom of the hill, sheathed with whin and coppery bracken, looks elusive and spectral through the drift of cold rain that sweeps in front of it.

The gale that sweeps along the summit of the hill rives the misty curtains in twain, and against the clearer sky the summit cairn stands clear. But only for a moment. The sweeping hurricane once more draws the curtains tight, and not again do we see the beacon's stony pile against the wild cloud-ruffled skyline.

As we were approaching the first reservoir, I asked Mr. Rodwell, "About how much higher is Pendle beacon than where we are now standing?"

"As you see, we appear to be somewhere between 150 to 200 feet below the top of the bywash in front of us, which is 811.25 feet above ordnance datum. This would make us approximately 1,200 feet below the beacon, which is 1,837 feet above sea level."

"That is an interesting figure, Mr. Rodwell, as being the year of the accession of the late Queen Victoria to the throne."

"And interesting also, Mr. Bates, in that there is a difference in height of exactly 1,000 feet between the beacon and the top water level of Lower Ogden Reservoir, which we left a little while ago, and which is 837 feet above sea level."

We mounted the steep embankment of Lower Black Moss Reservoir, and walked the length of wide promenade to the overflow. At the outlet to the reservoir, I noticed a line of fine mesh wire netting, about a foot high, stretched across.

" What purpose does this netting serve, Mr. Rodwell? " I asked, pointing to it.

" That is a length of half-inch netting, placed in position there by the fishing club, to prevent fish escaping from the reservoir into the stream."

From the overflow, down the byewash, flood water was pouring, like the water that came down at Ladore. To me it was a beautiful sight as it rushed and roared within the stony confines of the narrow gullet. But not so to my guide. He, being more practical and businesslike, sadly deplored the apparent waste of storm water rushing towards the river.

He racily indicated how this freshet could easily and cheaply be utilised for the generation of electric current for lighting up adjacent farm houses and the villages of Barley and Narrowgates. " But," he continued, " I believe Mr. Newton has a scheme more extensive than this for utilizing the larger flow at Whitehough. If his plan had to mature, there would be generated sufficient electric power to meet the whole needs of the valley above Roughlee."

" On this subject and the future development of these reservoirs at Black Moss, we shall have an opportunity of learning what Mr. Newton has to say when we see him."

My guide led the way across a bridge, over a field, through a patch of rain-sodden herbage, up a low bank to Old Overhouses, a yeoman's cottage built between the years 1560 to 1580 A.D. The mullion windows, though innocent of glass, have remained unsullied from the talons of the improving vandal. The walls in places are five feet thick; there is a fireplace with a ten feet span, built on lines of great simplicity, yet of beautiful outline.

The front of the house faces due south and commands an aspect of field and meadow, of stream and wood, rolling hill and verdant dale, as delightfully idyllic as heart of man could desire, lover choose for his home, or poet imagine in his most glowing ecstacies.

It was a new house at the time Shakespeare was penning his immortal plays; the newness was still on it when Bunyan was lying in Bedford jail dreaming his " Pilgrim's Progress "; it harks back to England's spacious days when Raleigh, Frobisher, and Drake plunged their wooden prows into the sparkling salt wave to seek the shores of unknown lands at the far fringes of uncharted seas; it has passed through the turmoil and stress of the Stewart and Cromwellian days, and experienced something of the changes, social, religious and political, that then transpired.

Through the changing centuries and varying dynasties this dwelling of Old Overhouses has reposed in its quiet hollow like a nest under a sheltering bank. There is no noise here, save the busy quiet noise of running water, the singing and calling of birds, whispering of leaves, and dulcet murmur of the traffic of bees.

This old homestead—now a ruin—is a thousand miles from the whir and rattle of Nelson. It has braved the heat and storms of three and a half long, tedious centuries, and now in the sere and shrivelled leaf of its old age it is laying bare to the elements its oaken ribs, its gritty bosom, its eyeless windows, and the acid canker of rough weather is bringing its saggy roof trees to the mouldy dust. Sic transit gloria mundi.

PART IV.

RIDGALING RESERVOIRS AND BARLEY FILTERS.

The more I see of this part of Nelson's municipal enterprise the more I am thankful that we have such an abundant supply of good water for domestic and industrial purposes.

All human labour must keep near to or be able to command a never failing supply of water.

Our weaving, engineering, trade, health and life, are dependent upon it. The water is as necessary as the tools.

Cut off completely Nelson's water and within twenty-four hours Nelson would be a deserted town. One can do without solid food for quite a long time, but one cannot long endure and exist without water.

Our local industries follow the streams or keep alongside the canal. If a mill or workshop be erected in a place at any distance from stream or canal, water must be conveyed to it and stored up in pond or lodge.

All waters running through Nelson are dammed up at suitable places to provide steam for mills.

We could under certain conditions, dispense with our electricity works, municipal trams and 'buses; we could manage even without our gas supply; we could forget our theatres, kinemas, music halls and football matches, but under no conditions could we neglect the water supply and live.

The town has to keep its water supply in advance of its growth.

The Water Engineer and his Committee hold the most important offices that a municipality can bestow on an individual or deputation.

Imagine the horrible conditions our drains would get in if they were never flushed with clean water. It is water that keeps all the arteries of our town sweet and wholesome; it is water, in the form of rain, that keeps our air fresh and breathable, revives drooping vegetation, refreshes the parched country side, and keeps all nature alive.

Mr. Rodwell was anxious for me to see the Ridgaling Service Reservoir, now in course of construction; so we " slipped up " to pay an official inspection.

This tank, when completed, will hold five million gallons of water. Parts of the sides of this reservoir will have to be banked up to fifteen feet above the present level of the ground. The top water level will be 755 feet above mean tide.

A tremendous amount of good clean sand has been excavated and will be used in cementing the sides and bottom of the holder. Yellow and blue clay are in plentiful evidence, and along the reservoir bottom can be seen the darker strata lines of soft coal. The inside measurements of Ridgaling reservoir are 100 yards by 45 yards and it will be 23 feet deep.

The reason for making the reservoir on this hill top is to secure a satisfactory head of water to the whole of the town.

This work was started in the early part of this year (1925); an average of 80 men, blacksmiths, navvies, gangers, &c., are engaged, and except in a few instances were all taken through the Employment Exchange.

Mr. Rodwell stated that this reservoir will be served from Lower Ogden (which is at an altitude 82 feet higher than Ridgaling), by means of a 24 inch pipe, the water passing on its way through the pressure filters at Barley.

In connection with this undertaking there are certain offices necessary to ensure the health and comfort of those engaged thereon; of these, the dining room and latrines, Mr. Rodwell was at pains to explain to me.

The dining room consists of one large Nissen hut, wide, long, lofty, light and airy, with splendid lantern lights the whole length of the roof. Its length and breadth are, roughly speaking, 65 feet by 21 feet. The floor is the uncovered native earth and is very dry.

There are long and short tables for the diners, though tablecloths, serviettes, valets, and serving maids are dispensed with.

I noticed that every table top was spotlessly clean, nor could I discover—though I searched—a single crumb, dab of grease, bacon rind, stray bone or piece of gristle anywhere about. If there is any mouse in residence in that hut that thinks it will get a good living off the crumbs from the tables it will find itself " sadly let in."

A broad shelf is provided for holding pint pots, cans and dinner tins, and in other parts are 3 inch nails for hanging coats and caps on.

Forms are provided for the diners to sit on, and I noticed how clean the seats were.

In the rear corner of the dining room is a place where is kept all manner of tackle, such as spades, trenching tools, picks, long handled shovels, piping, wire scaffolding rope, long iron rods, mops, wading shoes, cross cut saws, window poles, sledge hammers, lead ingots, a machine drill and one youth who was curious about my presence.

The latrine is in a hut apart, and for spotless cleanliness would be hard to beat. It is under cover of a small Nissen hut. It consists of a tippler screening chamber, detritus tanks, precipitation tanks, sand filter and humus tanks.

I could never have guessed what this department was had I been led through blindfolded. It is a place as sweet and as clean as the dining hall.

Whilst Mr. Rodwell was busy consulting men on technical matters in relation to the work on hand I took my stand on a little mountain of sand and looked around from Pendle in the north west to Herders and Bouldsworth in the east.

And what a change from the day before. Then all was dull under the haze of a damp September day. To-day, the air was crystal clear; a strong breeze was blowing; white wool-pack clouds sailed across the sky; there were seas and oceans of Naples blue overhead, and the sun shone with midsummer clearness.

At my feet lay the wide and grassy Roughlee Valley with the plumy foliage of its thousand trees waving in the breeze; above the valley stretched the gentle slopes left of Hollin Wood. Looking at Pendle I could see its massive breast robed in heather and bracken. The sharp cleft of Deep Clough, dark with shadow on its west side, showed clearly through the crystal air. Coming round I could see Stangs, Offa, Intake, Hollin Wood, Wheat Head, Jackson's Slack, Burnt Moor and forward on to Weets. Right of Weets stood Blacko Tower, and far behind, over Foulridge Moor, lay Rylstone Fell. Coming east I made out Elslack Moor, Noyna, Great Edge, Cowling Pinnacle, and well to the right Emmott Moor, Herders, Jackson Ridge and Bouldsworth.

My guide returned, and together we went into the dining hall, and there happened an incident I shall long remember and treasure.

A man, minus coat and waistcoat, with shirt sleeves rolled above his biceps and open at the neck, came towards us. His hands, arms and face were covered with smithy grime. Various designs were tatooed on his forearms.

He addressed a few remarks to Mr. Rodwell about his work, got the required answers and some further instructions. That done, the man was about to turn away, when Mr. Rodwell, in a quiet tone of voice asked him if his wife were improving in health.

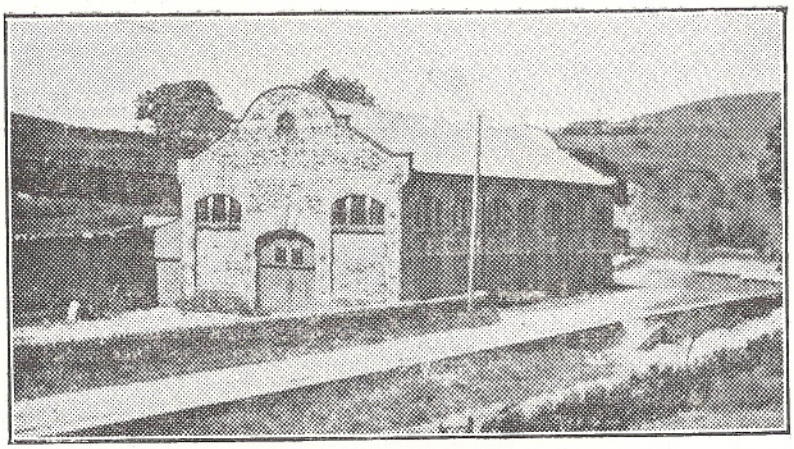
" I'm sorry to say, sir, she's very little if any better. I think she'd do fine if I could get her out here in the fresh air. I am hopeful that soon she will begin to mend."

My guide asked a dozen questions, to each one of which he got a suitable answer, and finally the man was given words of cheer and encouragement.

I could see that man went back to his work with a much lighter heart. He had received a little manly sympathy, and it did him good.

From Ridgaling we went forward through Thorneyholme to the quarry from which has been delved all the walling and road metal for the Thorneyholme to Barley road. I was assured that the material was " all freestone and that it squared up nicely."

At this point we were joined by Mr. Alfred Normington, water bailiff, whose additional weight, smiles, and jokes about the two Winchester quart bottles he held between his knees put a severe tax on the limited space and horse power of our car.



THE FILTER HOUSE.

At Barley Green we visited the filter house. There are 12 enclosed filter drums; huge, pot-bellied things, each eight feet in diameter and 6ft. 6in. high. The water from the reservoir enters the filter house through a 14 inch pipe, restricted to a 3½ inch Venturi tube, thus creating a vacuum, which draws precipitated chalk from the chalk plant into the water.

Sulphate of alumina is added by means of four reciprocating pumps which are worked by turbines driven automatically by the water entering the filters. The sulphate of alumina acts as a precipitant. In passing through the filters the water is forced through a bed of granulated sand.

"Do these filters never need restoring, Mr. Rodwell?"

"O, yes; they are cleaned out daily, though not in the way you see them being done at present, in this respect, the sand is not removed from the filters."

"How is it done, then?"

"This design here will explain. In the centre of the filter is a hollow steel shaft to which hollow arms are attached. When the filter needs to be cleansed the water entering the filter is cut off, and filtered water is forced into the base of the filter, thus bringing the sand into suspension, and through the hollow shaft and arms, from which it emerges through a series of small gun metal valves and cleanses the sand already held in suspension. To render this process more thorough the shaft and arms are rotated by means of the oil engine you see there, thus stirring up every particle of sand within the filters during the cleansing operation. The deposited sediment is washed away down the bell mouth you see at the end of the battery."

"How long does it take to cleanse each of these?"

"Approximately a quarter of an hour to 20 minutes, the length of time depending on the amount of sediment to be removed."

"What are those perforated discs in the bottom of the filter?"

"They are the gun metal covers of conical cups which are coupled direct to the filtered water main, these cups being filled with small hard gravel to prevent the sand from the filter being carried into the main along with the water, and the perforations through the covers are made so small that only a very small proportion of sand finds its way into the cups."

"About what quantity of water is filtered daily?"

"Nearly 1,800,000 gallons a day are passed through these filter beds alone. If you could separate one drop of water as it enters the main trunk and time it at that point and again the moment it splashes into your kettle at home, you would find that a matter of two and a half hours had been taken up in the journey."

There were several men in the filter house. Only one of them did I know at all, and as I watched him at his tasks my mind went back to the time I once saw him lead two lively young bulls to the watering trough. He walked between them, and to let me see how docile and kittenish they were he grasped their horns and banged their heads together.

It will be a good twenty-eight years since Harry Nutter performed that deed of daring do in Sabden Fold. Mr. "Jack" Mason is in charge of the filter house. His plain manner, his manly smile, his jovial blue eyes and homely Lancashire dialect appealed strongly to me. He held out a hand in which I found the real Lancashire grip. Then he issued instructions as follows:—

"Neaw, Mr. Rodwell, do be careful what yo' say to him. Don't use onny long words

if yo' con help it. Yo' see ther's all sorts o' folk reads th' 'Leader,' an' if you' come eawt wi' long jaw breykers ther's lots on us 'll not be able to read 'em, an' even if wo do read 'em we's never understand 'em."

To those injunctions so solicitously adumbrated Mr. Rodwell promised to pay strict attention.

"Neaw, Mister Bates, yo'n just come at a reight time; we're cleyning eawt these filter drums, so yo'll have a good change to look inside one—that is if yo're noan to going to a bit o' trouble."

Mr. Mason led the way forward, conducted me up a steep flight of iron steps, along a narrow gantry to a place where a filter drum was being cleaned and overhauled.

The only fault I had to find with Mr. Mason was his enthusiasm. I simply had to thoroughly inspect the inside of the filter drum, the driving rod, the arms, valves, inlets and outlets, note the thickness of the metal composing the drum, the mechanical parts that start and stop it, observe that the outsides of the drums were sadly in need of a coat of paint and varnish, and—I fled, because I was afraid my enthusiastic friend was about to thrutch me through the aperture of the drum to make a closer inspection inside of what I was doing my best to note from the outside.

PART V.

NARROWATES NURSERY.

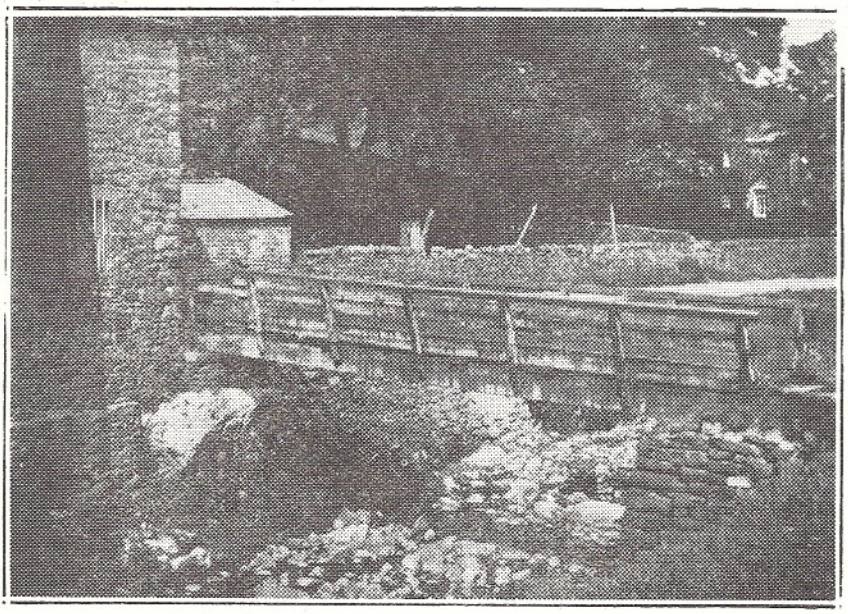
From Barley Green we went by way of the old footbridge to the nursery at Narrowgates, and on the way I made the acquaintance of Mr. Alex. R. Lawson, the plantation superintendent. He is a Scotsman and an optimist! His dark clouds appear to have a broad silver lining. He has no use for a pessimist. He could not suffer one gladly, no, not at any price. His heart is in his work. He takes as much interest in the tiniest seedling as in the most gigantic specimen tree.

The first patch of land by the river side, on which thousands of young trees are being developed, he considers to be ideal for the purpose. He walked with me from bed to bed, naming and giving me the numbers of most of the specimens under cultivation.

Starting from the end nearest Whitehough, we took the beds in due order. I will give the list seriatim so that readers anxious to verify Mr. Lawson's statements may do so and at the same time receive instruction.

First, bed of Oregon pine, or Douglas fir; 2nd, bed of Corsican pine; 3rd, bed of Norway spruce.

These are tiny things, not above two inches tall, are packed as close as grass, and are now hardening for winter. They are losing



FOOTBRIDGE AND LIMESTONE BLOCK AT NARROWGATES.
Photo: J. Duxbury, Blackburn.

their bright green cast and assuming a reddish purple tint. I was requested to draw the back of my hand over them to note how hardy they were.

"In this bed," said Mr. Lawson, "are a variety of cuttings; balsam poplar, from the river side; limes from Thorneyhome; cuttings of mangolia and peris japonica. This privet was pinched out of Mr. Rodwell's garden; these are hybrid roses; next, several rhododendron cuttings—an experiment, this—double white lilac, black Italian poplar, 3 'Daily Mail' roses—that's the only paper that ever tells the truth—and"

But better pay attention to Mr. Lawson's remarks.

"This row of fir trees are what we have got back from people who had stolen them."

"Do you mean that people have topped the wall and pulled up plants and carried them off?"

"That is exactly what I do mean. Of course there's any amount been stolen that we have not got back."

"How do you feel about it, Mr. Lawson?"

I thought for a moment I had caught my optimist in a pessimistic mood. He spat out, and said,

"I feel very strongly on this matter. If you are going to make any public statement about it you may try and express just what I feel. That is if you can."

I ask; what can one think about the vandals whose fingers itch to possess anything that does not belong to them? In this case these misguided people are not only robbing the ratepayers of Nelson, they are actually robbing themselves at the same time. Trees that were planted on the high side of the new road about four years since have been cut down for the making of walking sticks and switches.

It is a shame when constant watch and ward has to be kept on communal property. I object to that kind of vandalism; first, because I hate to know it is done; second, because I am being robbed of what I shall have to help to pay for.

The authorities hesitate to prosecute, but the interests of the mass of ratepayers must be considered.

I would make each culprit captured buy ten plants for each one pilfered.

It is such people who sneak wreaths from off the graves of newly buried people, pinch Flanders Poppies from the calvaries of war memorials, snatch bluebells from children in the lanes, enter gentlemen's gardens by the back way to sneak prize blooms for buttonholes, and—yes, I believe they would take the tiny spray of forget-me-nots from off their dead mother's bosom.

I hope I have mildly indicated to the public what Mr. Lawson thinks but did not verbally express.

"How are these young trees bought, Mr. Lawson, by the thousand, or how?"

"Plants for any scheme of afforestation are bought by the thousand. We will keep along this path and as we go I will give you particulars of each bed.

One bed Sitka spruce, 2 years old, 30,000 plants; 1 bed Norway pine, 5 years old, 30,000 plants; 1 bed Scotch pine, 5 years old, 20,000 plants. These were subject to a parasitical fungus, and had to be carefully washed and sprayed in August. 1 bed Norway spruce, 2 years old, 35,000 plants; 1 bed Norway spruce, 4 years old, 30,000 plants; 1 bed Silka spruce, 5 years old, 10,500. These had to be sprayed for an infection of chemes coleyii, a species of plant louse. 1 bed Scotch fir, 2 years old, 52,000 plants. Our one failure has been in a bed of 2 year old larch, but though a lot of them died not all succumbed. Many that we thought were dead are now showing signs of life.

Here are a quantity of Douglas fir, 5 years old; also here is a patch of 2 year old beech, from home grown seed, and a bed of 5 year old larch, containing 2,700 plants.

In this nursery we have close on 285,000 plants with seedlings."

That number, as given by Mr. Lawson, is an approximate total of the plants in the Narrowgates nursery. If you look up the hillsides, right and left of the stream, you will find that many more thousands of young trees could be added to the total given; and again, there are the 12 acres planted at Coldwell.

It cannot be said that the Nelson Corporation have been at all lax in their afforestation scheme. In a few years there will be within an hour's walk of Nelson Centre some of the finest woods anywhere between Preston and Burnley. Provided, of course, that the hand of the vandal can be restrained.

"I cannot think, Mr. Lawson, that all the trees planted survive; there must be a percentage of wastage."

"That is a fact. Here are some figures. In No. 1 bed, Sitka spruce, the percentage of deaths is 0.8; in the Norway Spruce 1,818; in the Scotch fir about 2 per cent."

"That is bringing the death rate down to the lowest possible dimensions. Can you give me the average death rate of nursery plants in England."

"This has been a bad nursery year, and statistics report that the average death rate throughout England is fully 50 per cent."

A lot is due to the nature of the soil, a lot to favourable natural conditions, and a tremendous lot to the scientific skill of a capable and expert Scotch gardener.

Lucky Nelson!

PART VI.

INTERVIEW WITH MR. CHAS. E. NEWTON, J.P., M.INST., C.E. CONSULTING ENGINEER TO THE BOROUGH OF NELSON.

It was left to Mr. Rodwell to make arrangements for our visit to Mr. Newton at his home at Timperley, in Cheshire.

It was on a Monday we went, the vehicle selected to convey us was a "Ford," and the chauffeur a stalwart hight Jim.

The " Ford " having reposed in the garage all the week-end was feeling a bit heady at the start. She began by buckjumping, rotating on her axis and leaping imaginary hurdles.

These little peccadillos subsiding we made good progress as far as Burnley. Here it was found necessary to send divers telegrams, presumably to various urban authorities en route, warning them of our approach.

We sped through one town where the natives say " aw durn'd know," and " thad betther ex thad mon theer."

At Bury the municipal road roller (Invicta) hailed our approach. I am inclined to think this was an oversight on the part of the Mayor, Aldermen and Burgesses of that loyal township. We did expect something more regal and becoming to the social status of our party.

We passed through Salford. In one street the shop signs gave us much food for thought. They were such real, old fashioned, purely English names we saw painted on window and sign board. I noted a few as follows, Popoffski, Schabatt, Levinski, Oppenheimer, Rosenburg, Sobolinsky and Romonoffski.

Not a single, solitary foreign name like Jones, Brown and Smith could I discover.

The policemen at the centre of Manchester were most gallantly polite. I drew Mr. Rodwell's attention to the fact that they kept blowing kisses to us, perfect strangers though we were. Now that was something like a civic welcome, and quite up to the Mancurian standard.

Mr. Rodwell, whose mind is built up on very prosaic lines, assured me that the police were not blowing kisses to us, but by their movements merely regulating the traffic.

On sped the " Ford," and, leaving the city's grime and din entered a long wide highway, tree lined and villa dotted.

Near to a telephone pole, at an angle in the road, our car turned quick to the left, entered a narrow, close hedged lane, drew up at a pair of heavy closed gates and pip-pipped.

Two minutes later we passed through those gates, stepped upon a pebbled drive, noting as we went along the broad sweeps of green lawn that had been rolled and cut and cut and rolled until they have become smooth as vellum and soft as velvet pile. There was a bijou lake on the right with lilies and a waterhen; close heavy bushes fringed the lake; near by are tall trees to which singing birds come in spring-time when blossoms scent the gale and daisies dapple the sward. A dog came romping to my feet, insisting on being friends. He wagged his tail until he seemed posssessed of a dozen, barked for the whole neighbourhood, ran round and round, and—when I looked up a gentleman was standing in front of me, smiling, holding out his right hand and speaking a hearty welcome.

He led us forward into the house, pointed to chairs, filled his pipe out of a big tin box, passed the match across the rug and opened the conversation.

And what a precious three and a half hours followed. And how we talked, and what old books we glanced into, what old words we discussed, what old yarns we spun, how awfully soon the gong sounded for tea and how fearfully fast the finger of the clock on the mantle shelf sped round.

It would take up too much space in the " Leader " to describe the spacious hall of baronial proportions, the broad stairway leading up to the study, the wide steps down from the hall to the dining room, the swords, the boomerang from Walla Walla, the ancient halberd, the dainty pictures, artistic decorations and bold entrancing friezes, the maps, ornaments and easy chairs.

We talked away, hammer and tongs, like three overgrown school lads. Laugh! we laughed like lads at play until it came to business; then, ah, then! did my host push my nose close to the revolving literary grindstone.

What Mr. Newton does not know about Nelson's water supply, from the building of the first reservoir to the fixing of the last tap washer, could be written in school hand on a postcard.

And so to business.

" There are many people in Nelson. Mr. Newton, who have no idea how the town got its name. Can you throw any light on that point?"

" The erection of an Inn at the four lane ends (now the centre of Nelson) gave the town its name.

" Soon after the victory of Trafalgar in 1805 a man named Matthew Pollard called his rural wayside public house the " Lord Nelson Inn," but it was not until many years after, namely in 1849, when the East Lancashire Railway Company built a small station in the vicinity and called it " Nelson," that it became a recognized name for the district.

" Even then, there was no township of that name, the station being in Little Marsden, and was to serve the villages of Marsden, Bradley, and Barrowford, the last-named being the largest.

" The place, however, soon began to grow, and prior to 1858 Mr. William Ecroyd, of Lomeshaye, and his neighbours made two attempts to forward a Waterworks or a Board of Health."

" Were they successful in their efforts?"

" Messrs. Ecroyd had already constructed a small waterworks to supply their property, and did not favour the formation of a private Water Company for the district which was proposed in 1858 by a Burnley firm of solicitors, but wished to see the Local Government Act which was passed that year put into force and a Local Board formed which could deal with both water and gas."

" At what date was any definite action taken?"

" It was not however until 1864 that any definite action was taken, when, on August 27th of that year a meeting of ratepayers was called by Mr. Benjamin Chaffer in Salem School to discuss the advisability of adopting the Act.

"Considerable opposition was raised, but the result of a Poll gave a majority in favour of 209, in a total poll of 651, and in December, 1864, the first local government Board was formed, consisting of Messrs. W. Tunstill, William Ecroyd, Benjamin Chaffer, Samuel Gott, George Harland, John Varley, James Landless, Lawrence Judson, William Baldwin and William Hitchin.

"The district of the Local Board was carved out of the townships of Great and Little Marsden, and extended from Reedyford to Lane End, and from the river to Barker House, embracing an area of nearly 600 acres."

"Having gone so far, what was their next procedure?"

"The first important business the new Board had to undertake was the provision of a water and gas supply, and in the following year deposited a Bill in Parliament, which received Royal Assent on June 11th, 1866.

"This Act provided for the purchase of the existing small Gas Works undertaking, but more particularly for a public water supply and before the end of 1869 upwards of 1,000 houses were supplied.

"The water limits were defined to be the Nelson Local Board district, and the hamlet of little Marsden (now Brierfield Urban District).

The number of houses in 1865 estimated as likely to require a supply of water was:—

Nelson district	835
In Brierfield district	495
	1,330

or say a population of 6,500.

"The works were designed to supply at least 8,000 people with about 130,000 gallons a day or 16¼ gallons per head."

"How were these districts served with water?"

"They consisted of a line of 8 inch iron pipes from Catlow Brook with smaller branches to Pot Hole and Ringstone Beck, terminating in a service reservoir holding two million gallons near Waids House, together with a Compensation reservoir on Walverden Water containing 25,000,000 gallons.

"The Local Board was empowered to take from the three streams only as much water as would pass through three orifices or gauges, together 15 inches wide and 3 inches deep, all surplus to be allowed to pass down the stream for the millowners' use."

"About what quantity was supplied?"

"The maximum quantity which could be obtained through the gauges was about 350,000 gallons a day, but the minimum in dry weather only amounted to 100,000 gallons a day."

"Regarding the building of these small reservoirs, Mr. Newton?"

"Tenders were accepted for constructing the service reservoirs, the 8 inch main, and for distributing mains in the town:—

	£	s.	d.
For the service reservoir	864	11	4½
For 8in. pipe laying	501	1	8
For 8in. pipes to the reservoir ...	1215	10	8
For distributing pipes	1603	1	6
For laying them in the street ...	645	12	6
For sundry valves, about	80	0	0
A total outlay of	£4909	17	8½

"The Walverden Reservoir construction was deferred owing to the tenders exceeding the Engineers' estimate of £3,196-0-0, but subsequently carried out, mainly by direct labour under the supervision of Samuel Holden, the first Clerk, Surveyor, and Water Manager to the Local Board."

"About how much a day did those employed get?"

"The rates of pay for the labour employed ranged from 3s. 2d. to 5s. 10d. a day, the majority being at 3s. 4d. This was in 1867—8".

"Leader" readers will conclude that the foregoing statements of Mr. Newton's constitute a series of vivid historical miniatures of the rise and growth of Nelson from a tiny wayside village to the large and important town it now is.

But Mr. Newton does not live entirely in the past. Not by any means. This the reader will discover in his following statements.

Coming to matters more up-to-date I put to him the question of the future of Nelson's reservoirs.

"Can you supply "Leader" readers and the ratepayers generally with any information regarding Black Moss and Whitehough reservoirs, Mr. Newton?"

"The reservoirs in Black Moss Valley now provide the Compensation water, which enables the whole of the produce of the Ogden Valley to be taken to the town; but in 1918 the Corporation obtained Parliamentary powers to construct a reservoir at Whitehough for compensation purposes, and to appropriate the Black Moss water; thereby guaranteeing to the town an extra one and a quarter million gallons a day when required.

"To fully develop the resources at Black Moss it will be necessary to raise the embankment of the lower reservoir 25 feet 9 inches, which will bring the top water level up to that of the lower Ogden one, with which it will be connected, so that the water levels will rise and fall in unison, and to some extent the water will mix before passing through the filters to the town."

"What provision will this give the town?"

"The total capacities of all the reservoirs in the Pendle district for the use of the town will be over 500 million gallons, giving an assured supply of nearly 3 million gallons a day from that source throughout the worst imaginable drought.

"But before Black Moss supply can be tapped, it will be necessary to construct the Whitehough reservoir."

"How will Whitehough reservoir compare with our existing reservoirs?"

" This when completed, will be the largest reservoir belonging to Nelson, and will contain upwards of 260 million gallons."

" Where exactly is the site of the new reservoir, Mr. Newton?"

" The site of the embankment is in the valley between Thorneyholme and Whitehough, and it will be 80 feet high above the river bed at the point of crossing.

" The reservoir will be a fine sheet of water, an ornament to the district with the new road running all along the south side of it, and in course of time will be well wooded on both sides, attained by the afforestation planting recently done."

" Will it be possible to use this sheet of water for pleasure purposes?"

" Most certainly. It will be admirably suited for boating and fishing, being more than three-quarters of a mile long."

" That will mean the entire destruction of Whitehough, as what took place at Ogden when the lower reservoir was constructed?"

" It is hoped that the old grange of Whitehough will be re-built (without some of the present disfiguring outbuildings) in a better position overlooking the reservoir, and approached by a drive along the top of the embankment.

" You remember the old house at Ogden, Mr. Bates? "

" Oh, yes, I quite well remember it. You see I often passed it on my way to and from Pendle. I can easily now vizualise that cottage door, the windows to living and bedrooms, the view from its gateway, and the good woman who used to stand on the doorstep on sunny mornings with a baby in her arms."

Rising from his chair, Mr. Newton went to a cabinet, and returning placed an old photograph in my hand—produced herewith.

I saw in a flash the whole Ogden valley as it was before the lower reservoir had been started—the fields, the meadows, the old walls, and I felt again the great calm and presence of the wide, sunlit, airy vale that lies between Barley Green and the summit of Pendle.

" We experience abnormal floods in Pendle Water, Mr. Newton, what provision is made to regulate flood water?"

" As the area of gathering ground above the reservoir embraces well over 3,000 acres, ample provision must be made to deal with abnormal floods, consequently the overflow weir will be 120 feet long."

" What will be the nature of the embankment?"

" The embankment will be constructed, having special regard to the geological conditions, which are confidently believed to be favourable, and much better than those met with higher up the valley."

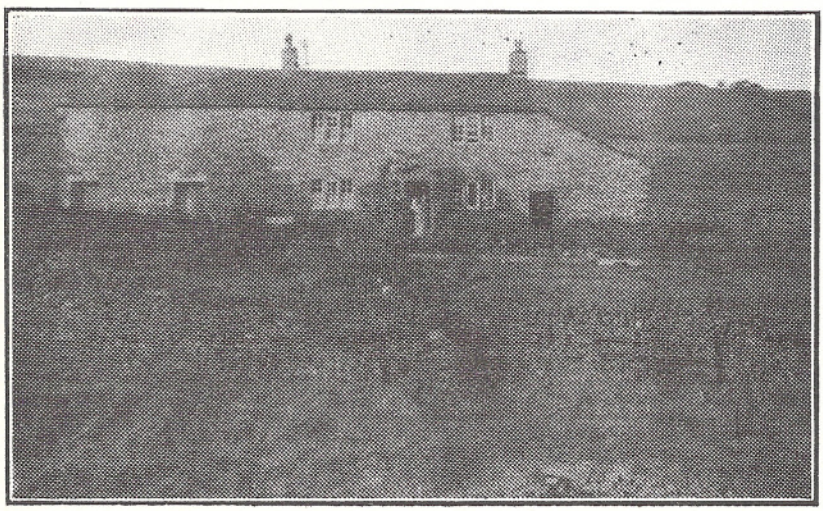
" Will expenditure be necessary in purifying the water?"

" No. As the impounded water is not intended for drinking purposes, there will be no necessity to make special provisions to ensure a high standard of quality, thus reducing the cost, which, in spite of present day prices is expected to be very moderate, and not exceeding the Parliamentary estimate."

" With our local staple trade at its present low ebb, will it be necessary to proceed immediately with this undertaking?"

" The hoped for return of trade prosperity will make the early construction of the reservoir imperative."

" When at Black Moss Mr. Rodwell told me that you had a scheme for the utilization of the Whitehough compensation water for the generation of electric current for power



Old Cottage (now demolished) whose site is in the bottom of Ogden Reservoir.

and lighting purposes. Is that so, Mr. Newton?"

"To facilitate and hasten the construction it is proposed to utilise the existing fall between Narrowgates Mill lodge and the foot of the new embankment to generate electric current for lighting the works, and the plant can afterwards be used for lighting in the district or the supply of some power to Narrowgates Mill, as the existing water power will be destroyed when the new reservoir is made.

"The water used to generate power will be taken from Narrowgates Mill lodge, by an existing pipe, and after use, will pass through a measuring basin into the river, and go to make up the required statutory quantity of compensation water, and so save drawing entirely from the reservoir."

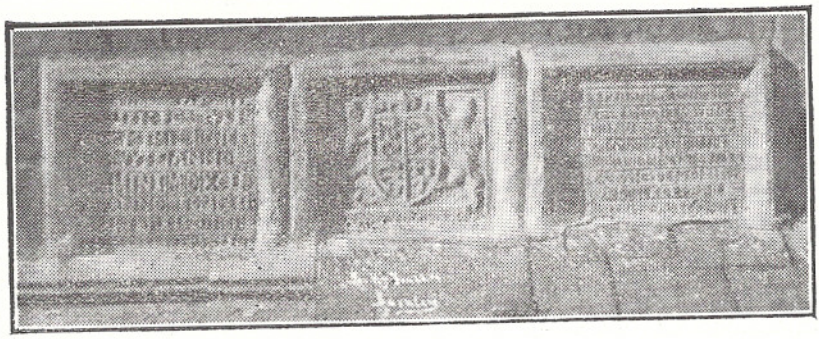
The gong had sounded for tea, but before we left the study, I said to Mr. Newton.

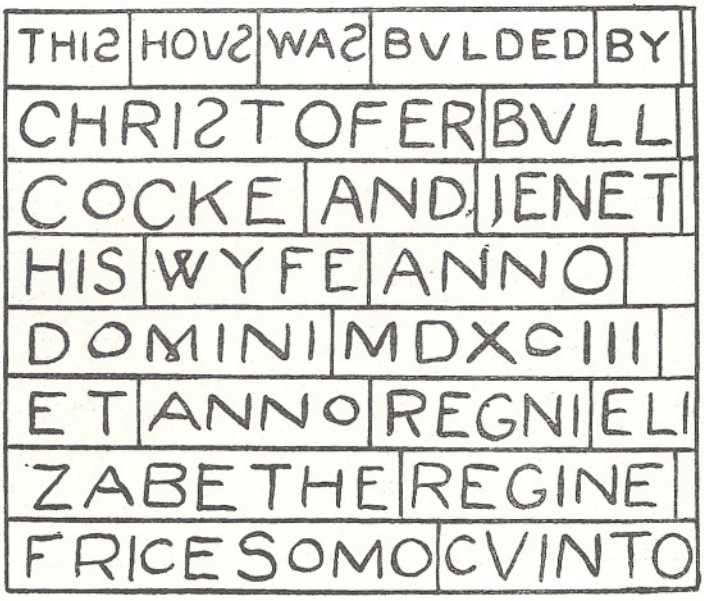
"There is one other matter I would like to mention, Mr. Newton. Along with hundreds of lovers of Pendle Forest I am interested in the preservation of the three mural tablets at Whitehough. I think they will be preserved?"

"That is so. Mr. Rodwell has been to great trouble in deciphering them, and his is the most complete translation I have seen."

"Thanks, Mr. Newton. I am hoping with this article to present to "Leader" readers photographs and translations of those most historic tablets."

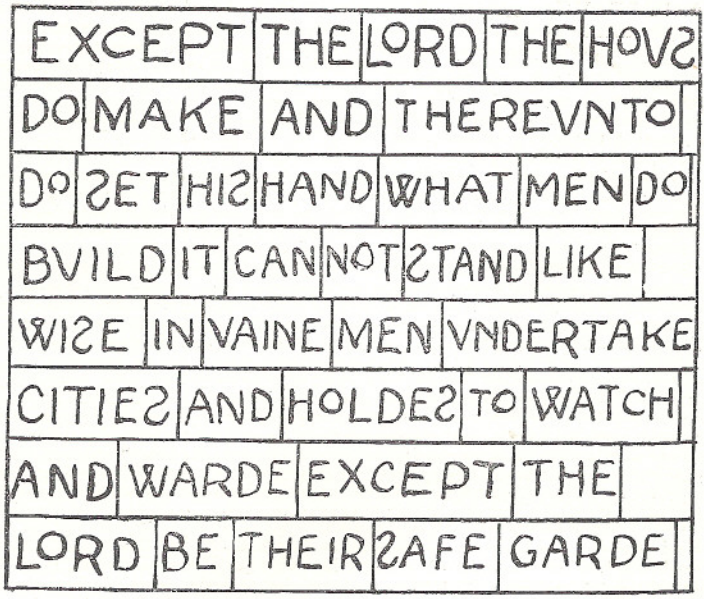
We ceased talking "shop" at the tea table, and whilst Mr. Newton poured out the tea, Mr. Rodwell carved the meat and your humble served the fruit and cream, we descanted in highbrow language about "owd noitered ceaws an' new noitered ceaws," and the problem of people who were handicapped in life through doing things "keigh paw" and "skew-wiff."





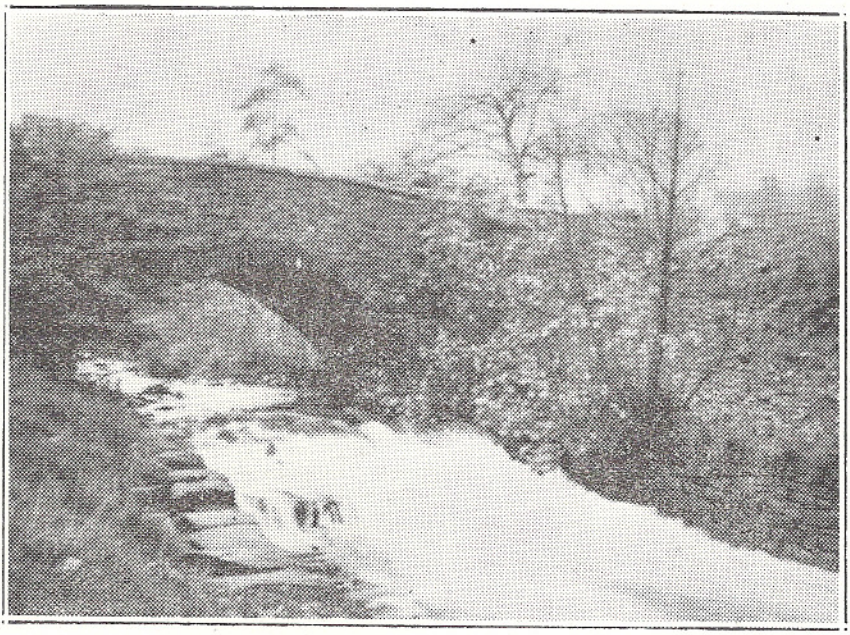
LEFT-HAND TABLET.

This house was builded by Christofer Bullcocke and Jenet his wyfe in the year of Our Lord, 1593, and in the 35th year of Queen Elizabeth's reign.


EXCEPT THE LORD THE HOVS
DO MAKE AND THEREVNTO
DO SET HIS HAND WHAT MEN DO
BVILD IT CANNOT STAND LIKE
WISE IN VAINE MEN VNDERTAKE
CITIES AND HOLDES TO WATCH
AND WARDE EXCEPT THE
LORD BE THEIR SAFE GARDE

RIGHT-HAND TABLET.

Except the Lord the hous do make
And thereunto do set His hand,
What men do build it cannot stand;
Likewise in vaine men undertake
Cities and holdes to watch and warde,
Except the Lord be their safe garde.



OLD BRIDGE AND WATERFALL AT WHITEHOUGH.

PART VII.

When we resumed our conversation after tea, Mr. Newton drew my attention to what he thought was an error of judgment in my remarks about the Parker family, who were the original builders and occupiers of New House Farm, above Coldwell, as stated in Part 2 of this series.

Whilst pointing out my probable error, Mr. Newton stooped down, picked up his tobacco tin placed it firmly between his knees, filled his pipe, put back the tin, struck a match, got a good draught, and turning towards me tapped my left knee with the tip of his right finger, and said :—

"I am a bit doubtful about the correctness of your statement about Robert Parker having been married twice. You suggest that this Robert Parker, senior, lost his wife, 'Jane,' and some few years later married 'Grace,' and commemorated them both in the building. May it not be that Robert Parker, junior (co-erector), had a wife, Grace, who was associated with him in building the barn?"

"That proposition had never entered my head, Mr. Newton, and I am sorry if I have done the old yeoman an injustice and saddled him with a second helpmeet."

From New House our talk drifted to Roughlee and Whitehough. Mr. Newton said :

"It may interest you to know that an old first edition of 'Whitaker's Whalley' in the Manchester Free Reference Library, which is freely interleaved with M.S.S. notes, and otherwise annotated by a former owner, there is a pen sketch of a tablet at Roughley (lee).

"A note at the side says:—

THIS	HOWS	
WAS	BUILT	B
Y	W W	IN T
HE	YEAR	OF
OUR	LORD	1584

"inscription of a corner stone of a man-
"sion at Roughley the property of Edward
"Parker, of Allancoate, late of the Bare-
"crofts, said to have been acquired by
"them as a forfeited mortgage.
"Copied March 22nd, 1854.
"the second figure is indistinct, it was
"thought by the inhabitants to be a 4."

"Have you seen that tablet, Mr. Bates?"

"Many a time. It is in the corner at the west end, about a yard or so from the ground. There is one mistake, I think, in your sketch, Mr. Newton."

"Indeed; and what is the error?"

"It is in the second word, "HOWS." At Roughlee Hall the word, "house," is spelt as you here show, only the H is leaned on its side. It is a not unusual method of placing the H, but in this instance the observer has failed to note it. Whether the H was chiselled in that manner purposely, or was merely an act of caprice or not, I cannot say. Certain it is that the old illuminators were deft hands at twisting conventional and accepted forms of script to meet their whimsical thought, and fanciful pen, and this might be a case where the artist in stone has borrowed a thought from the artist in pigment and leaf gold."

Mr. Newton mentioned Brast Clough, behind Under Pendle Farm. The clough that I have always associated with that name lies on the N.W. side of Pendle, and overlooks Mearley Clough and Hall.

Mr. John Collinge, of Barley, once told me that another name for that romantic spot was Ess Clough. Regarding the formation of these cloughs, Mr. Newton had an item of interest to impart.

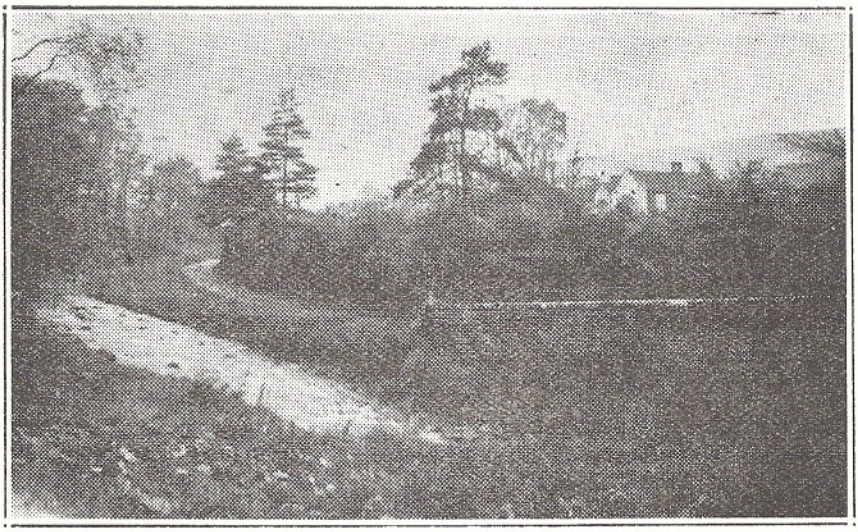
"The Brast Clough at Under Pendle, now known as Deep Clough, is one of those curious gorges, caused by super-saturated peat starting to float, and having once begun to move, continued like a glacier to gouge out a ravine with a flood of black mud and stones. It is referred to in 1703 by Chrstopher Townley in his correspondence as an 'eruption of water out of Pendle Hill.' The one brought into Harrison Ainsworth's 'Lancashire Watches' is on the west side of Pendle. They are not unknown now, and some years ago I saw the ravages caused by one off Blackstone Edge, which did much damage to the Morley Corporation Reservoir."

"In the last ten years, Mr. Newton, many tons of stone have broken away from the parent mass up in Deep Clough, and quantities of sodden peaty soil have slipped away. Six years ago one block, weighing several tons, rolled from the upper part of the clough, and falling flat side down, came to rest among loose stones and thistles. There was a fall of stones last year, but not in such huge pieces."

We often use the words "Water Gates" without fully recognising their significance. They were common enough words in Burnley when I was a lad. Mr. Newton knows what they mean. He said—

"The 'Water Gates' (Saxon) in both Ogden and Blackmoss valleys were at one time the only means of good access to some of the higher 'intakes,' and very jealously did the landowner below insist on vehicular traffic being confined to them. When the Upper Blackmoss Reservoir was made, the contractors had at first to cart all their plant up by way of the 'Water Gate,' with cruel loss of horseflesh."

"Mr. Rodwell and I have visited Whitehough three times, Mr. Newton, and seen the tablets. We are hoping to see published



THE RIVER AT WHITEHOUGH.

in the 'Leader' a few good photos of the district. I am sure you will enjoy the one accompanying our to-day's chat."

Our host had much information to impart regarding the mural tablets at Whitehough Grange. The reader will see just what Mr. Newton means if he will refer to last week's "Leader."

"The last line of the 1st tablet evidently refers to the year in Queen Elizabeth's reign which (1593) would be the 35th. I take it that the middle tablet depicts the Arms of the Duchy of Lancaster (then also the Royal Arms) to which the whole of North-East Lancashire belonged."—Turning to Mr. Rodwell—"I think you have done remarkably well in being able to clear and accurately define the last line of the third tablet."

"In the Whitehough district the Bullcocks —there are various ways of spelling that name—appear to have been long resident.

"Prior to 1507 there were no owners of land except the Earl, and people living in the district were either villein tenants—those allowed at the pleasure of the Lord to cultivate portions of the land for their own use—or bailiffs, who lived at the granges, with herdsmen, who sheltered in the booths and who looked after the various vaccaries or breeding farms belonging to the lord. Whitehough would appear to have originally been the home of one of these servants. At the deforesting in 1507, among other lands, were two parcels—Hawbooth and Whitley in Hawbooth (? Whitehough), and in these were squatters' holdings which were demised by Copy of Court Roll to James Hargreaves, Robert Bullcock, William Holgate, John Robinson senior, John Robinson junior, Thomas Varley, Roger Hartley, and John Bullcock. Robert Bullcock was the largest holder in 1527, Christopher Bullcock in 1607, and Richard and Christopher Bullcock in 1662.

"It would be interesting to know how far back the Bollard title to Whitehough goes, and I wonder if Foulds Bollard knows anything about it, or if the Abstract of Title discloses any history thereon.—Anyhow, I hope the Corporation will agree to Whitehough being re-built—stone by stone—on high ground north of the reservoir when it is built."

"Hear, hear, Mr. Newton."

It is good to know that Nelson has, as engineers, two such men as Mr. Newton and Mr. Rodwell; men thoroughly in love with their work, and keen in a desire to preserve for us the natural and architectural features of the loveliest part of our entrancingly lovely valley.

Whitehough House is a vital section of Pendle Forest's constitution, as much so as are the old grit walls, the river running nigh, the fields of soft green grass, the meadows robed in buttercup gold, fringed with ringing bluebells, hem-stitched with daisies, hedged with thorn, milk-white with bloom of May; the homely farmers, their buxom, comely wives, and their lovely daughters of the 1925 Lancashire Witches.

This old house, with its mullion windows, thick walls, cool kitchen, frigid buttery, stone stairway; this old house with its unique mural tablets, its comfortable, cosy living room, its warm bedroms, its ancient fireplace and convex fluted doorposts; this old homestead commanding adorable vistas of sylvan beauty, within constant sound of mountain water; this ancient grange, with

all its associations, legends, tales, and family history, its loves, its hates, its rise and decline is a thing to be preserved, to be proud of, to be held in respect and kept in honour. In its prime it was a genuine work of art—more valuable than the finest picture ever painted—and as such we ought to consider it with tender care ere one grey slate is removed, or gritty block disturbed. The beauty of this building is ours. Long years ago its sylvan setting and pastoral charm ceased to be owned by landlord. His claims were ever nominal. But the glory of the house, its shadowy historic past, its warm enbosoming trees, the stream speaking with a thousand varied notes, the verdant, mellow woods, the snowdrops grouped on the lawn, the crocuses under the copper beeches, the swinging daffodils along the drive and in the open meadow, with all the quiet beauty of wild flower, fragrant blossom and green of whispering leaf, belong to those, who, wandering by observe with careful eye and ponder with grateful heart upon the romantic setting of this old yeoman's home.

"Up to now, Mr. Newton, we have been dealing pretty much with men and affairs of the past; but there are amongst 'Leader' readers many who simply wallow in rock bottom, steel riveted facts. Suppose we take the reservoirs in their order, and present our readers with granite facts that 'winna ding.' When I was up at Ridgaling with Mr. Rodwell, he pointed out to me the peculiar nature of the outcrops, such as shale, two bands of coal, fireclay, freestone, and distintegrated sandstone rock. A few particulars would, I feel sure, prove welcome."

"Just as you like, Mr. Bates. Suppose we start with the one at Waids House Road, and follow on with Walverden.—

WAIDS HOUSE.

Contract for this, and pipe line from intakes made with Messrs. Foot and Heaton, April, 1867. Difficulties were experienced in making this water-tight, owing to excavation exposing old forgotten coal workings near the outcrop of the Arley Coal seam. They were effectually cut off by means of puddle.

WALVERDEN.

As constructed, the embankment was 36 feet high (above bed of stream) and excavation for puddle trench went down, in the deepest place 26 feet Gravel, sand, and marl were met with in the trench, and a bed of alluvial marl formed generally the seat of the puddle wall. Difficulties were experienced with running sand (called quick sand). This reservoir bank and overflow cill was raised in 1896 2 feet, to reinstate the original cubic contents of the reservoir which had been reduced by accumulation of silt."

"One cannot imagine works of these dimensions being constructed without accidents, mild or serious, taking place, Mr. Newton."

"That is a fact. There was an amusing, though at the time alarming incident took place at Walverden Reservoir. An ugly slip occurred from one side of the trench. Many men were working on the job at the time, and, naturally there was a rush for safety. Suddenly agonising cries for help were heard from beneath the debris, of a

ANCIENT DWELLINGS AT WHITEHOUGH.

man calling to be quickly released before he was crushed to death, or suffocated. Frantic efforts were made to get him out, the men working like the proverbial niggers, straining muscle and nerve to reach the entombed man.

At last all was got clear, but no man was found where the fall had occurred. The men were gathered, the roll called, but no one was missing.

It then transpired that one of the gang was a ventriloquist."

"Rather a grim sort of a joke to play. I leave you to follow on, Mr. Newton."

COLDWELL.

"Height of bank above stream 68 feet, greatest depth of trench 56 feet. A fault was met with running N.W. by S.E., filled with clay. Boulder clay, wet sand and gravel beds, ragstone, and a thin seam of coal were met with. The seat of the puddle wall is for the most part on a good impervious shale bed, but owing to the dislocation caused by the fault, the shale had to be penetrated through in the deepest part of the valley, and the trench extended through about 30 feet of grit rock down to a thin bed of shale overlying ironstone rock.

UPPER OGDEN.

Height of bank above stream, 73½ feet; greatest depth of trench 61 feet. A considerable amount of debris had to be passed through in the bottom of the valley before stratified material was reached, and it was tilted at an angle of about 35 degrees across the valley. It consisted of hard rock sandwiched with thin beds of shale, and a continuous bed of shale forms the bottom of the northern half of the trench, but the trouble here was that the strata being at so steep a slope, combined with the great weight of rock on each side of the trench, the shale in the bottom had a tendency to "creep" before the weight of the puddle wall could be got on to it to hold it down.

Leakage occurred, not through the wall or embankment, but through the underlying rock beds. A shaft was sunk just inside the reservoir and about ten 4in boreholes, varying from 45 to 100 feet deep put down through the middle of the embankment and wall, through the concrete cradle at the bottom, and well into the rocks below. Cement grout was then forced down under pressure into the rocks below. The pressure applied, combined with the weight of water in the reservoir, compelled the grout to find all the crevices and joints in the rock. The grout was continuously forced down until no more would go. Altogether 96 tons of cement were so disposed of, and the leakage stopped. A stone quarry, which had been opened in the reservoir was probably the place where the water entered the rock beds which underlie the embankment."

"I should imagine you are giving the public who like facts something to fasten their teeth into, Mr. Newton. I am wondering what you will have to say about Lower Ogden?"

LOWER OGDEN.

"Height of bank above stream, 81 feet; greatest depth of trench, 100 feet. The depth of debris in the bottom of the valley was no less than 65 feet, consisting of gravel, broken stone, shale, and clay. The rock formation below that was somewhat the same as at Upper Ogden, namely high pitched beds of rock and shale across the valley, and a small fault running longitudinally, but not quite parallel with the trench was met with in the South wing. This caused considerable anxiety, and an iron pipe was brought up from the bottom of the trench to the top of the bank for the purpose of grouting, if found necessary. It has not been used. Like the Upper Reservoir, the North wing has a continuous bed of shale for its base. In order to break the dragging action of the puddle down the steep slope of the trench bottom, the concrete cradle was finished in a series of sloping steps, three to four feet high and eight feet long—thirty of such steps exist in the South wing. The massive concrete base carrying the outlet culvert also forms a wedge to break the tensible strain on the puddle, and tends to compress it.

The getting of clay in the reservoir, upset the stability of the hill side on the north, and ruined a waterman's house which had been built, and threw the bye channel out of position. This was reinstated, and made firm by means of expanded metal re-enforcement."

The reader will notice that our esteemed Engineer uses no needless words. They are here produced just as he expressed them; short, concise, to the point. He next referred to the Black Moss Reservoirs.

UPPER BLACK MOSS.

Height of bank above stream, 40 feet; greatest depth of trench, 15 feet. This, though comparatively simple, requiring a very shallow puddle trench in to a continuous bed of tenacious boulder clay, was not without its difficulties. Owing to the clayey nature of the material used to form the bank—signs of slipping developed. Wide trenches were therefore cut into the outer slope of the bank, and filled with broken stones, forming buttresses to the puddle wall, and the outer toe was widened and weighted, which effectually stopped the movement.

LOWER BLACK MOSS.

Height of bank above stream, 49 feet; greatest depth in trench, 68 feet. This is an exceptionally curious embankment, but is believed to be absolutely tight. It was thought that conditions somewhat similar to those at Upper Black Moss would be found, and, as a matter of fact, a continuous bed of boulder clay stretches across the valley;

but, in the deepest part it was found to be excessively stoney, and its watertightness doubted. Consequently, for a length of 33 yards, the trench was deepened.

At 35 feet down a mass of "book leaf" clay was met with, which, had it been continuous might have been relied on, and at 40 feet down was a thick bed of gravel. Ultimately more clay was reached, which, but for one small point, was continuous, and there, at 60 feet below the surface, some grouting was resorted to. The excessively argillaceous character of the whole of this valley extending to a great depth, warrants the firm belief that this reservoir can with perfect safety be raised when required."

Mr. Newton's pipe had gone out, Mr. Rodwell's cigarette was cold. I sat in my chair, my eyes fixed on the thoughtful face of our kindly host. We had become so entranced with the subject in hand that for us tobacco and time had ceased to exist.

As we sat quiet and gazing into the glowing fire, I felt a strange sensation creep over me. I could not account for it at the moment, but happening to glance at the clock and noting the time, I discovered what had sub-consciously prompted the feeling. Pointing with accusing finger at the fingers on the dial I said:

"Goodness, Mr. Rodwell, look at that clock! It's twenty minutes past seven; we are leagues from the centre of Manchester, and still more leagues from Nelson itself."

It was no easy task parting from so kind a host, and ere our hands had unclasped I told Mr. Newton that he could be assured beforehand of the unstinted thanks of all "Leader" readers for the favour of a chat with him and the information he had so freely imparted.

PART VIII.

A CHAT WITH COUNCILLOR J. H. S. AITKEN, J.P., C.C., Mayor of Nelson.

A committee cannot very well conduct its business without the aid of a chairman. On all Town Council committees chairmen are needed who have not only a thorough knowledge of the work contemplated and under consideration, but also a sound grounding in the duties devolving upon a chairmanship.

It is by the various committees that the main of the council work is done. The public is given to understand, and quite naturally expect, that no proposition will be considered or business undertaken that is not advantageous to the best interests of the town as a whole. As ratepayers we suppose that our councillors are that, not only in name but in deed.

Whatever one's political opinions may be, one cannot with honesty accuse Councillor Aitken of being lax in his duties to the town of Nelson. He has been on most of the Council committees, and has held the position of chairman on two or more, including at the time of writing, that of the Water and Baths Committee.

Feeling sure that Councillor Aitken would have much useful information to impart to the ratepayers of Nelson, I begged, in their interest, the favour of a chat on matters relating directly with the town's water supply.

The request was immediately granted.

When I met Mr. Aitken I found he had prepared himself with a fund of data; sure proof of thoroughness, a methodical mind and business habits.

Still, I had my own list of questions, which list I read out to him for his consideration and opinions thereon.

"How long have you served on the Water and Baths Committee, Mr. Aitken?"

"When I first entered the Council, 12 years ago, I served on the Water and Baths Committee for two or three years. Then, as often occurs, there was a re-arrangement of committees, due to new members coming on the Council and the elevation of some senior member of the Council to the Mayoral chair. Much against my own desires I had to leave the Water and Baths Committee at that time.

As time went on I was again elected to sit on that committee, and for the last three years I have been its chairman. Prior to that I was chairman of the Health Committee."

"What are the specific duties of the Water and Baths Committee?"

"Our task is that of dealing with the Waterworks; and the duty of the committee is to provide a plentiful supply of pure water for the Borough of Nelson; and not only Nelson, mind you; we have to supply Brierfield, Barrowford, Blacko, and that part of Pendle Forest which includes Wheatley Lane, Fence and Higham.

"To do that we have to make new reservoirs, maintain those already in existence, impound water and see to the distribution of it over the area indicated."

"About what total of population do you supply with water?"

"Roughly speaking, a population of about 65,000."

"Seeing that Nelson and district are growing fast it means your committee have to look well ahead?"

"That is so. In a general way, it is essential a water committee should look many years ahead. In a rapidly growing industrial centre like ours it is necessary to think as far as twenty to twenty-five years in advance as to what the probable supply and demand would be. We must keep the water supply years ahead of the growth of the population too, otherwise disaster would ensue.

"To carry out any large reservoir construction from beginning consideration of it to finishing it and impounding the water, you can allow from ten to fifteen years."

" Would you care to enlarge on that thought, Mr. Aitken please?"

" We have on hand now a certain scheme which has been authorised by Act of Parliament. The first installation of work under that scheme was the laying of the new pipe line—just recently completed—from Lower Ogden Reservoir, and the construction of Ridgaling balancing reservoir which is now in process."

" There is a need then for Ridgaling reservoir?"

" Yes. The one outstanding fact that has emerged during the last year or two, and is necessitating the careful consideration of the committee at the moment, is the growth of building in the higher parts of the town. The tendency of building to spread out in the Halifax Road and Marsden Hall and upper parts of Barkerhouse Road is causing the Water Committee to have to give special consideration of storage capacity and ability to meet increased demand for water in those higher parts."

" What action can your committee take to meet the call?"

" The plan of extension of waterworks undertaking does provide for an additional reservoir to be made above the existing Coldwell reservoir; and whereas many people thought that would be one of the undertakings that would probably be delayed many years, the present indications are that it will become a matter of practical necessity before long."

I was thankful that just here Mr. Aitken got a ring on the telephone, and that by the time the call was answered a young lady came into the room with a note requiring immediate attention. Those two breaks allowed me a few minutes needed respite. If Councillor Aitken keeps his nose to Council committee work as diligently and closely as he kept mine to the business on hand, there won't be much time wasted in useless confabulation.

Then there cropped up the question of complaints from users of water whose supply is at times somewhat restricted.

Councillor Aitken keeps on his desk at his office a " Complaints Book." People stop him in the street, send letters to him by post, drop them into his letter box, and call upon him at his office, and by these means air their grievances and voice the nature of their complaints. Each complaint is duly entered into his special book and afterwards forwarded to the Water Engineer for him and his staff to deal with. Mr. Aitken put the case as follows, and in this instance he pleaded for plaintiff and defendant.

" There have been many complaints about the defective water supplies in certain parts of the town. In practically every case it has been found to be where there has been a joint service pipe which has been called upon to do more than it is possible for such a pipe to do. Very often through the lapse of years the pipes become furred or clogged up.

" Occupiers at one end of the street found no difficulty in obtaining their supply; but at the other end the water merely trickled out of the tap, taking hours sometimes to fill the bath or run through to complete the day's washing. For years we have given temporary relief; but the Water Committee has recently decided that the only effective—and in the long run the only economical—way of doing is to lay down a new main in the back street, with a separate service pipe and stop tap to each house."

" That will entail considerable expense, Mr. Aitken. How will such changes be met and whom by?"

" That question was debated in committee, various solutions were advanced, but finally it was decided that the costs should be apportioned between the Corporation and the property owner; the property owner to pay £3 and the Corporation £5 11s."

" Do you find that arrangement to work all right?"

" The difficulty is with those property owners who are fortunate in having a good supply of water through living in the favourable end of the street. They think they should not pay. But the point really is this: It is one main pipe for the common use of all the owners in the street, and to remedy any defect in that pipe all the common owners must contribute equally, although it may be that the particular length past one owner's property is not at fault.

" In a sense, it is a case of the Corporation promoting Socialism!"

" Now now, Mr. Aitken, do be careful, else you might be having a deputation from the I.L.P. waiting on you and inviting you to become a member of the Labour Party. In which case we would have to address you as Comrade Aitken."

It will be no news to those who are up-to-date in local government matters to learn that for years now certain large towns and cities have assumed and exercised the power of appropriating certain favourable watersheds and natural formed lakes to their own particular use. Having put their hand on some huge lake a hundred miles away, or an extensive drainage area, they have said in effect, " Hands off;" " Trespassers will be prosecuted." They have claimed the land, the water and all that thereon and therein is.

In a sense a quite laudable ambition and a far seeing policy. But there are others. The action of such authorities has been to cause lesser towns often to be placed in most difficult straits regarding their water supply.

This is a matter in which Councillor Aitken and his committee are vitally interested. Not that the question directly affects or is likely to affect us in this district.

Mr. Aitken said.

" The idea has been set forth for a few years now—and it has the approval of the Ministry of Health—for the formation of Regional Water Boards. They will be established to allocate water supplies and so prevent any one authority monopolising any particular source of supply to the detriment

of adjacent areas, which will mean prevention of overlapping and little towns constructing little reservoirs."

Our worthy councillor told me how certain small municipalities were placed in sadly disadvantageous conditions through large corporate bodies enclosing vast areas all to their own use.

Such a method of procedure is not fair to small towns situated at any distance from a free natural flow of water for domestic purposes.

How fortunate Nelson is, ringed as she is with spacious reservoirs at the very fountain of supply.

The office of the Regional Water Board will be to exercise mandatory powers and prevent a grab-all policy on the part of overgrown towns and cities.

Continuing his argument, Councillor Aitken said :—

" There is a national board called The British Waterworks' Association, to which are affiliated all water boards, municipal undertakings and private companies. The one great difficulty is that of compensation water; and for years this association has been going into this question; the view they hold being that millions of money (literally) is spent, and a vast amount of water allowed to run to waste through the excessive amount of compensation water which authorities are called upon to supply.

This question of compensation water is a vital one and affects us locally, because the next extension of works in the Whitehough valley will necessarily call for increased supply of compensation water.

The claims of mill owners and other riparian owners, as well as the demands of the Rivers' Board (in our locality the Ribble Joint Committee), have to be considered and all legitimate claims met.

There is a growing volume of opinion throughout the country among water engineers and experts that much expense to the country might be saved whilst meeting all legitimate claims, and representations to this effect are being made at present.

The object of the British Waterworks' Association is to bring the whole question of compensation under review, so that all parties' claims can be adequately met without putting the ratepayer to more expense than is necessary."

" How do our water charges compare with those of other towns?"

" When the last increase of charges was made, Mr. Rodwell had prepared for the Council's benefit a large statistical map. The curving lines indicated the rise and fall of certain town's water charges. Nelson's place was about the average, the Fylde Water Board the highest indicated on the map. On our present charges we are certainly considerably below those of some towns near to Nelson."

When Councillor Aitken had dictated his message to the young lady clerk and dismissed her, I asked him the following question :—

" Suppose, Mr. Aitken, that at the next full Council meeting some practical, level-headed councillor proposed the reversion of the Nelson municipal reservoirs to the tender care of a private company, what would happen?"

Councillor Aitken flashed a look at me through his spectacles that caused me to instantly get a firm grip on my chair. I could plainly see that he was mentally gauging my weight and calculating the distance from the desk at which I was writing to the bay window; and at the same time I was visualising the twenty feet of nothingness between the window and the spiked railings beneath.

Fortunately for me he concluded I might after all be joking. Hence, I still live.

My host pointed out that, solely due to natural geological conditions, the capital expenditure on Nelson's reservoirs was comparatively low. He instanced how great an advantage the new service reservoir at Ridgaling would eventually prove to the town. This new, covered-in reservoir, when complete, will hold a two day's supply of water. The town will be supplied from here. The outflow will be constant and even, thus equalising the flow from the filter house and providing a means of increased filtration. He also dilated on the point of this extension providing work for men who had been long unemployed.

" In regard to the preservation of the old house at Whitehough; what are your thoughts on that matter, Mr. Aitken?"

" Mr. Newton, our consulting engineer, has expressed a strong desire that it should be preserved, and the Water Committee view that question with great sympathy.

" I am hoping when the new Whitehough reservoir is constructed that the house you refer to will be removed stone by stone with great care and re-erected on a site just above the new water line."

" Thank you for that kindly assurance, Mr. Aitken. As you know there are a number of people, not only in our district, but all over Lancashire, who would view as a calamity the destruction of the old house at Whitehough."

I left Councillor Aitken, convinced in my own mind that the Nelson Water and Baths Committee have in him a chairman who knows the nature of the duties devolving upon him, and that the Borough of Nelson have in him a sincere and hard working servant.

Part IX.

INTERVIEW WITH MR. J. S. CORBETT, SECRETARY OF THE ENGLISH FORESTRY ASSOCIATION.

" So it has ever been to me, by day and by night, summer and winter, beneath trees the heart feels nearer to that depth of life the far sky means, the rest of spirit, found only a beauty, ideal and pure, comes there because the distance seems within touch of thought."

We have in our district many avenues of lovely trees; we have also in wood and hedgerow, about gardens, parks and at field corners, trees in clusters, in small groups and singly.

To such as ramble our countryside and take note of interest in our trees, find in them food for contemplation, study and remembrance. At Edge End, Montford, Monkholme, about Reedley, in Wheatley Lane, at Wycollar, up Admergill, one may find trees of noble dimensions, splendid girth, spreading foliage and delightful outline.

The few remaining beeches at Montford are without equal in our district. Their trunks, smooth, massive, columnar, solid and powerful; their swaying boughs, slender branches, tapering twigs, and tender green leaves, spreading well over the roadway are ever charming to the eye, refreshing to the mind and noble to contemplate.

Those beech trees are a vital bit of our Witchland landscape. Their beauty belongs to all who behold them.

The Grimshaw Oak in the fields above Higherford is known the wide world over wherever Nelson and Barrowford men and women reside. The memory of it thrills the hearts of men and women in America, Canada, New Zealand, Africa, Australia. Its very leaves have grown into their souls. It is to them a tower of strength guarding the sacred boundaries of the land they loved in their youth.

They stood under it, made love under it, dreamed dreams beneath its spreading boughs. The sentiment of it is in their blood. It is their tree though they may never again see it.

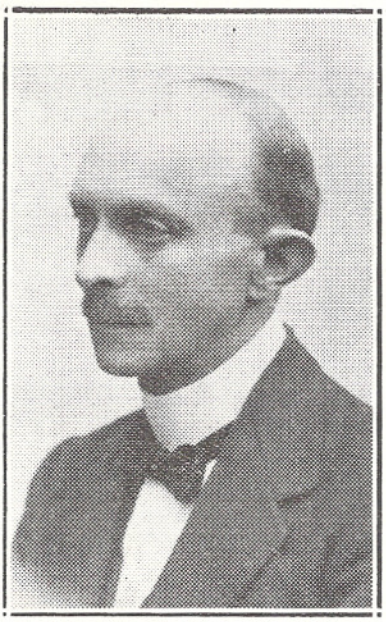
This old oak tree is so enhaloed with sentiment and association that everything ought to be done that can be to preserve it to us.

Trees answer many purposes; as timber they are indispensable in trade and business; from them is made our furniture, the chairs we sit on, the table we dine at, the bed in which we rest, are born in and hope to die in when our natural times comes..

In connection with their waterworks the Nelson Town Council have adopted and are developing an extensive scheme of afforestation.

This is a wise move on their part and worthy of all the moral support that ratepayers can give. This scheme has necessitated the assistance of those who know how to plant and the expert advice of one who knows what to plant, when to plant, and under what conditions to plant..

THE GRIMSHAW OAK.
[Photo : J. Duxbury, Blackburn.



MR. J. S. CORBETT
[Photo : Wykeham, London.

Whilst I was about making notes for these articles there came on a visit to the afforestation areas at Barley and Coldwell, Mr. J. S. Corbett, secretary of The English Forestry Association, whose headquarters are at the Imperial Institute, London. Without a moment's hesitation he promised to grant me an interview.

Mr. Rodwell, when introducing me to Mr. Corbett, informed me that he was one of the best authorities on English forestry, that he had a fund of information to impart, that his visit was brief, and that all I had to do was to fix my own hour for the appointment.

In quite a humorous vein Mr. Corbett replied that it would give him pleasure to have a chat, and that on the matter of afforestation he "would tell me the whole truth, or as near the truth as possible."

There was no difficulty in fixing a day and hour, and at the appointed time I visited my host at his hotel and presented to him a list of questions that I had drawn up.

"Here are about fourteen questions, and every one of 'em teazers. But before I answer them it will perhaps be best to preface the answers to them with a few general remarks. I notice that you quite naturally approach this matter of afforestation strictly from a ratepayers' point of view."

"That is so, Mr. Corbett. You see, I am a ratepayer, and in the answers to those questions I am hoping to get information from you that will appeal to the average householder who is financially interested in this scheme of the Council's."

"Quite so. Now afforestation must first be approached from a national point of view. We must enlarge our vision and look, not at Nelson alone, but at the whole empire. We must look at it from the widest imaginable point.

"We import into this country timber of the value of between 40 and 50 million pounds sterling per annum, of which amount less than eight per cent. is produced within the Empire.

"There are in this country over five million acres of land which are valueless from an agricultural point of view that are quite suitable for afforestation. That land is at the present time—may I put it—employing no labour other than possibly an occasional gamekeeper."

"Could most of these acres be utilized for afforestation?"

"They could, and if they were planted it would mean in addition to the actual labour of planting, on an average of probably £5 per acre, the continuous labour of at least one man for every 50 acres until the crop was mature."

I was thankful that Mr. Corbett dropped into a brown study for a full half minute, it gave me time to mentally vizualise those millions of treeless acres up and down our country; I began to see those waste lands being gradually brought under control, cleared of rubbish and weeds, planted with young trees and men busy nursing them, so that in years to come those saplings, no higher than my knee, would flourish as a green bay tree, drape our country side with beauty and take from our waste lands the drab monotony of uniformity.

"Supposing that all or part of these five million acres of waste land were planted with trees would there be a demand for the timber when the trees were matured?"

"That the census of production of timber throughout the world goes to prove, probably within twenty years the existing extractable supplies of timber will be practically exhausted, assuming that the consumption increases at the present rate."

That provided me with a galvanic shock, but a more serious jolt was awaiting me. Continuing, Mr. Corbett said:—

"I am going to tell you something that will surprise not only you but probably most of those who will read what you write. It has for long been thought that America supplied the world with timber. America, whose forest wealth was supposed to be inexhaustible, is already importing more timber than she exports."

"Judging from that alone, I think we can assume that within twenty years the price of timber, particularly soft woods, will appreciate to a very considerable extent."

"Can we produce timber in this country of a quality equal to what we get from abroad?"

"Yes; providing that if properly grown, the correct varieties selected to suit the particular soil, altitude and exposure, and more

important still that the timber be converted and seasoned with the same care as the foreigner exercises.

" First Archangel deals are cut from Scotch pines, exactly the same variety as we are planting at Nelson. The cheaper form of white deal is cut from Norway spruce. Indeed, I know one large merchant to-day who cannot sell Scotch pine as Scotch pine, but selling it as first Archangel he obtains for it the same as the imported article.

" My next statement will probably cause you some little surprise. It is not generally known that the Great War could not have continued much longer as not more than another twelve month's supply of timber was obtainable.

" Germany is alive to the importance of afforestation, and is, through her agents, purchasing large quantities of young forest trees, seedlings and transplants in this country."

" When Mr. Lawson took me round the Narrowgates nursery he indicated that about six different species of conifers had been planted. Have these been planted for profit or to beautify the landscape?"

"To come to matters nearer home as they affect Lancashire. The scheme has been devised, first of all, as a business undertaking and a good investment, but landscape effect has not been neglected, nor will it be overlooked. It is easy by the insertion of a few varieties of hard words to obtain the desired landscape effect. Again, a few hard woods, particularly beech, in a soft wood area act as soil improvers."

" Why have conifers been selected above all other kinds of trees, such as oak, ash, beech, etc.?"

" Conifers have been selected for three reasons; first the ground is not suitable for hard woods; second, soft woods show a much quicker return on capital outlay, the final crop maturing at from forty to fifty years from time of planting, whereas hard woods—if one excepts ash—would not mature under 120 years; third, even where this soil is suitable for hard woods one must remember that the Empire can supply our wants in hard woods but not soft woods."

" Will an extensive afforestation of our catchment areas and Pendle Forest generally have any appreciable effect on our weather; say in regard to our rainfall?"

" Afforestation on such a small scale as at Nelson would have little effect on the climate, but it will have a very considerable effect on the supply and quality of the water, if little or no effect on the rainfall. Tree planted areas prevent rapid evaporation of surface moisture. The roots of the trees aerate the soil, which allows aqueous permeation; the trees, leaves, branches and twigs act as filters clarifying the rain."

" Will afforestation encourage in any degree the visits of wild birds not already indigenous to our district? "

" Most certainly. I do not know what birds you would encourage, but I am sure you would encourage many species at present unknown in this district. Migratory birds in particular would find in your plantations a delightful resting place."

" Would a reasonable planting of fruit trees prove an advantage?"

" The ground hereabouts is not suitable for anything but afforestation. The planting of fruit trees could not be looked upon as a commercial proposition.

" I am strongly in favour of planting and substituting for the formal avenues of forest trees along our new arterial roads groups of fruit trees where the ground is suitable. No; not cherry, except the wild bird cherry or Gean, apples principally.

" Now, Mr. Bates, you need hard facts, so here are some for your Labour men."

" Thanks, Mr. Corbett, give me facts, not only for Labour men, but for Liberals, Conservatives, Tories and any other brand of politicians."

" The ratepayers of Nelson should consider the subject of afforestation not only from a national standpoint, but as a means of reducing the number of unemployed and as a sound investment.

" Already the labour costs per acre, which, with the exception of the foreman, has all been paid to local men, have been 500 per cent. higher than had the area remained agricultural land."

" What staff will be needed to work this scheme?"

" At least two men will be required full time on the area already planted for the next two years to keep the young trees free from undergrowth and maintaining fences and ditches. After two years, until the first thinnings are taken, little labour will be required, but after, say ten years, at least two men will be required full time thinning and pruning. As a matter of fact the sale of the thinnings would more than pay their labour.

" If this land had remained agricultural the employment of labour would have been negligable, certainly not one man to every 100 acres."

" Can this venture be looked upon as a good investment other than as a means of relieving unemployment?"

" Certainly, yes. The extraordinary satisfactory results in view of a most unfavourable season lead me to believe that the selection of varieties was right and that there is every possibility of successful plantations being established."

" What about the cost, Mr. Corbett? You see I am asking this vital question not for myself alone, but for the mass of Nelson and district ratepayers."

" The maximum cost per acre will not exceed £12, towards which the committee have secured the Forestry Commissions Unemployment Grant of £4 10s. per acre. The scheme is thus carrying a net expenditure to the ratepayers of £7 10s. per acre. That is for work already done. Now, compound interest at 5 per cent. means doubling the original capital about every 14 years; therefore at 14 years

your capital equals £15, at 28 years £30, at 42 years £60, and at 56 years £120."

"That statement should appeal to such as like a good investment. I'll take a few more particulars if you don't mind, Mr. Corbett. Nelson folks are whales on figures."

"Now I think it would be safe to assume that the trees we have planted should mature at between forty and fifty years. But let us take the maximum of 56 years at £120. At that time the final crop should be at least 3,000 cubic feet per acre, which at 1/- per foot equals £150.

"In giving you this estimate I have not taken into consideration the value of the thinnings which will come out at about the tenth and twentieth years. The value of these, after paying for labour in maintaining and cutting, rates and taxes, should leave a balance in hand of somewhere in the region of £5 per acre.

"Are there any other striking features that we ought to bear in mind?"

"I will state a few. To sum up, afforestation presents five distinct aspects.

"First, it builds up a national reserve of timber; second, it can be looked upon as a sound investment; third, it increases employment, and remember it is productive labour; fourth, it improves the water supply; fifth, it adds to the beauty of rural England."

"That's good. Another matter I would like to obtain a little information about. How do wages in our locality compare with what is paid in other districts for this class of work?"

"I find that the wages paid to the unemployed here are higher than those paid to the unemployed in any other district in England and Wales, except the London area.

"This, of course adds to the cost of planting per acre, as half the costs of planting are made up in wages, and of the other half 80 per cent. represent wages in the nursery and 10 per cent. seeds and rent. In other words 90 per cent. of the total cost of planting is labour, and if afforestation is to be a commercial proposition it is the initial cost that matters.

"Every twenty shillings saved per acre at planting means a difference of £16 in 56 years."

That concluded our chat on local afforestation.

Mr. Corbett represents a very important organisation, and I was anxious for "Leader" readers to learn one or two points regarding its work, so I put the following question to my host:

"I would like you to give to "Leader" readers a few facts about The English Forestry Association, Mr. Corbett."

"With pleasure. Although we have been an advisory body for several years it is only during the last three years that we have undertaken planting under contract..

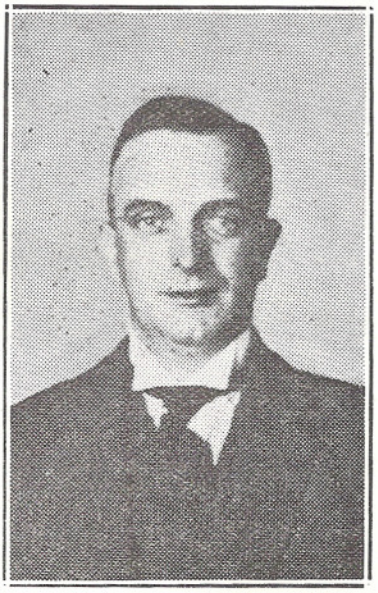
"The year ending to-day, September 29th, we have paid to the unemployed in wages upwards of £10,000. We are not allowed under our constitution to pay interest on our shares exceeding 7 per cent. The surplus, if any, is divided amongst the members of the association proportionate to their dealings.

"Although we have no official connection with the Government Forestry Commission, we are in closest harmony with them, and are endeavouring to do for the landowner what the Forestry Commission is doing for the State."

That concluded our business, and before leaving the Station Hotel I warmly thanked Mr. Corbett on behalf of the "Leader's" thousands of readers for the wonderful information he had so freely imparted.

PART X.

THE PUBLIC BATHS.



MR. F. WILKINSON.

The old baths in North Street had served their purpose. For years they had played their part in helping keep clean and sweet the bodies of the youth of Nelson.

But they were small, and Nelson was rapidly growing, and with its expansion increased its need for better, larger and more spacious bathing and swimming accommodation.

The Council for years had seen the necessity of providing new and better bathing facilities for the town. Various plans were mooted. One was the purchase of the old baths in North Street and remodelling them to meet the increasing demands of the borough. This scheme did not mature; others were advanced, and finally "the plans, &c., for the present scheme were approved

by the Committee in February, 1911, and it was resolved to make application to the Local Government Board for sanction to borrow the necessary money therefor.

"On July 25th, 1911, A. A. G. Malet, Esq., M. Inst. C.E., Local Government Board Inspector, held the inquiry, and in January, 1912, sanction was obtained for the loan. The quantities, &c., were prepared and tenders invited, and in March, 1912, the Committee accepted tenders and the works were commenced."

On Saturday, July 12th, 1913, the Nelson Corporation new Public Baths, in Bradley Road, were opened by Alderman (then Councillor) E. Boothman, who was Chairman of the Water and Baths Committee.

These extensive premises come within the survey of our inquiries into Nelson's Water Supply. They are an important feature in the town's list of properties and possessions. They are as necessary to the health of the town as are the dust bins, the road sweepers, and drain cleaners.

A clean body, internal and external, is a healthy body; a healthy body is a sound body, and a clean, sound, healthy body is a possession money cannot purchase, fame acquire, nor favour bestow.

It may be obtained by careful living, moderate exercise, fresh air and the frequent application of pure water within and without.

I have often seen the town's baths from the outside, and to-day I have the delightful experience of visiting and inspecting them from within. There are many people in Nelson who have never been inside these "marble halls"; consequently they have but faint idea of their dimensions, the staff engaged, the detail and routine work daily and weekly accomplished, the galas provided and the consequent good work done to the community from a health point of view.

I mounted the few steps to the door, passed through the turnstile, was taken in charge by Mr. Fred Wilkinson, the Baths Manager, and was ushered into the office where a young lady was busy folding up towels. We've all seen our mothers, wives and sisters folding up linen on a washing day and probably marvelled at their skill in that craft.

Believe me, they are the veriest amateurs compared with the lady towel folder at the Baths.

Just watch her. Well inside five seconds a towel is selected, doubled, again doubled, folded over, lifted and placed in position on an ever increasing Everest of clean towels at her right elbow.

She's a Paderewski at her job. At other times this lady plys needle and thread darning rents and tears. As the lads say: "Towels gets rovven neaw an' ageon," and the lady's task is to render "first aid." Apart from folding towels and repairing them she stands at the receipt of custom, receiving cash and issuing towels and bathing drawers to those entering the baths.

Mr. Wilkinson was most anxious for Nelson ratepayers to have facts and figures placed before them, and almost as quickly as the lady folds towels he produced books and printed and typewritten statements from safes, boxes, shelves, drawers and files, until the growing pile at my hand made me feel dizzy.

As he said, "No one in Nelson, youth or adult, male or female, need go dirty. There is ample provision here for all who are free from infectious complaints to have a daily or weekly bath or swim." (I noticed he laid special emphasis on the words "free from infectious complaints.")

Which is exactly what I thought afterwards as I walked about from room to room, upstairs, on the level, and down into the subterranean passages. The lightness, airiness, cleanliness, spaciousness of the whole department is apparant at every step. No one place is cleaner than any other place. The pay box where the young lady takes admission money ranks no higher in the matter of cleanliness than do the steps leading down to the vast labyrinths of underground passages. It is quite possible that if one went into the Nelson Municipal Baths in a spirit of inquiry and armed with a Sexton Blake magnifying glass, one might—if one were a Nosey Parker—find here and there a smut of dust. But that dark speck would not be there through staff negligence, but through some careless visitor not using the door mat.

Not far from the pay box are the eight women's slipper baths. They are enclosed in cubicles. Each cubicle contains the commodious porcelain bath, the necessary bath brushes, comb and hairbrush, mirror and clothes hooks.

A bell push is within handy reach in case of emergency; it communicates direct with the office, and each bell has its own number on the office signal board.

These cubicles are provided with electric light. There is a vapour box and a spray and needle bath. The baths are filled by means of a flat, broad, key turned tap, and two minutes completes the filling process.

The room in which these slipper baths are fixed is lofty, glass topped, radiator heated and provided with a waiting room. There is absolute privacy for the bathers.

"You will need a towel or two here, Mr. Wilkinson?"

"We have a regular stock of 4,600. On a busy Saturday we issue 1,500. On a Monday morning when we wash the Friday, Saturday and Sunday's towels we have to face an accumulation of not less than 2,500. On Sunday's we have from 100 to 120 bathers. As you saw we repair our own towels."

"Do you get a fair number of school children at the baths?"

"Scholars from the elementary and Secondary schools come in recognised classes. In 18 weeks we have had from the various elementary schools 16,892 children and from the Secondary School 1,420. The charges are 1½d. each scholar, which is paid by the Education authorities. These children have

all come at specified times; but last year, in addition to these, we had 8,927 boys and 4,171 girls who came outside school hours at a charge of one penny a head.

" For boys and girls who have left school, but are under 16 years of age, we have a special rate of 2d. a time. We have considerably reduced the charges, but hope to increase the attendance, if not the revenue. It will certainly increase the cleanliness."

" Do you get many really dirty children?" I have my ' annual ' you know."

" No; we don't. It's seldom we see a dirty lad. We've no trouble with 'em. Every lad who comes here knows before he goes into the plunge bath he has first of all to step into the shallow bath and wash his feet. The other lads would see to that if we didn't.

" The most up-to-date methods are adopted to teach children how to swim. Swimming tuition has become an art."

" Have you any idea as to the number of children who daily attend the baths?"

" We get an average attendance of 250 children every day in summer. The baths are open two and a half days for girls and the same for the boys. For the girls there is a lady instructor on part time, and for the boys a full time male instructor who after discharging his duties to the boys has other work to do."

" And what about the attendance of regular bathers, Mr. Wilkinson?"

" Our Bath's year finishes in March. From March 1924 to March 1925, we had 20,465 males and females attended the wash baths, and 61,986 who used the plunge baths, a total of 82,451 for the year. Our busiest day? That was on July 25th, 1925. We had 1,237 bathers, which is a record for one day."

All this information had been given to me whilst we were in the office, so clearing away the piles of books, &c., Mr. Wilkinson took me in charge.

In a souvenir booklet published at the official opening of the Baths on Saturday, July 12th, 1913, are a few particulars relative to the area, &c., of the baths and buildings. They are as follows :—

DESCRIPTION OF THE BUILDING.

Area of site, 1,270 square yards. Accommodation, 1 plunge bath, 75ft. by 30th; 1 plunge bath, 50ft. by 20ft; 10 men's slipper baths; 8 women's slipper baths; laundry; aeration and filtration plant; waiting rooms, office, &c.

In addition, vapour and needle baths are provided in one of each of the Men's and women's slipper baths.

The principal frontage of the building is to Bradley Road, the main wall being set back an average distance of 5ft. 9in., which allows of the formation of a small garden.

The front and part of end elevation are of parpoint walling, relieved with ashlar dressings. The side and back elevation are finished with seconds Accrington facing bricks.

The ticket office is placed between the male and female entrances, and by its central position, enables the attendant to have good supervision over the male and female slipper baths and both plunge baths.

Noiseless turnstiles, made by Skilbeck and Co., of Leeds, are fixed in the entrances for the purpose of checking the number of bathers admitted.

The floors of office, waiting rooms, and corridors are finished with Terrazzo, and those to entrance halls with tiles, the walls of the latter being also finished with tiles to dado height, and plastered above.

The walls of the plunge baths are finished internally with green and cream enamelled bricks to a dado height, above which they are faced with Hawarden buff bricks, relieved with green and cream bands.

The slipper bath walls are finished with white enamelled bricks to partition height and buff above.

Spacious subways are provided all round the plunge baths and under all slipper baths, &c., with the object of providing easy access to all pipes and fittings, and thus reducing the cost of maintenance.

The roof lights are of patent glazing, wirewove glass having been used for the purpose of preventing accidents to bathers in case of breakage.

SLIPPER BATHS.

The floors of Slipper Baths are finished with terrazzo. The partitions are of special white enamelled partition bricks, 2½in. in thickness, 7ft. 3in. in height, the lower portions being finished 4½in. above floor level for easy cleaning.

All baths are of white porcelain, glazed inside and outside, and stand upon glazed porcelain feet. The fittings to baths have been designed with a view to facilitating the rapid filling and emptying of the baths, a 3in. diameter waste pipe being provided for the latter purpose. Each bathroom is fitted up with electric bells, which communicate with the ticket office.

PLUNGE BATHS.

Large plunge.—The room is 99 feet long by 50 feet wide inside, and contains bath 75 feet by 30 feet, together with the necessary dressing boxes, 56 in number. The gallery runs down both sides of the room.

Small plunge.—The room is 62 feet long by 33 feet wide inside, and the bath 50 feet by 20 feet, with 15 dressing boxes.

The plunge baths are constructed of reinforced concrete, the watertight lining being, in the case of the large bath, natural rock asphalte, and in the small bath, " Ceresit " waterproof cement. The lining of the baths is of white enamelled brickwork, with green brick bands.

The usual footbaths, showers, and conveniences are provided.

The dressing boxes are constructed with Belgian granite slabs with expanded metal above. This allows of good ventilation and lighting, and also enables the attendant to

have proper supervision. The dressing boxes are not provided with doors.

LAUNDRY.

This room contains: Washer, hydro extractor, soaking tank, soap boiler, wringer, drying horses.

The power is electric, a 7½h.p. motor being used for driving the machinery.

STEAM SUPPLY, HEATING, &c.

Steam is obtained from the gas works, and is carried under Bradley Road by means of a 3in. steel main, laid in a brick conduit. The hot water supply is by means of two Royle's calorifiers with combined storage cisterns, the distribution to slipper baths being by means of 2in. and 1¼in. copper piping.

The heating to slipper baths, office, and lower portion of plunge baths is by means of low pressure hot water and Royle's calorifier, and the heating to roofs by means of steam, this latter being adopted to prevent condensation and down draught.

The system of heating the water to the plunge baths is in duplicate, it being either by means of Matthew's silent steam bath heaters, of which there are three to the large bath and two to the small bath, or by means of the calorific apparatus in connection with the aerating and filtration plant.

AERATING AND FILTRATION SCHEME.

Row's patent system of bath water purification has been installed, which continuously purifies and re-oxygenates the bath water, so that bathers at all times have the advantage of a perfectly purified and fresh bath water.

The Row system takes the water from the deep end of the bath, and by continuous pumping elevates it to a patent aerator on the roof of the filter, &c. house, where the water is broken up into a number of fine streams by falling through trays perforated with fine holes. The action of the air and light on the water ozygenates, purifies and bleaches the water, and effectually destroys all organic impurities. The water descends through pipes to a filter, where all solid impurities are arrested. The water thence passes through a reheater, which restores to it the few degrees of heat which is lost in the aearating process. After passing through the heater, the water returns to the shallow end of the bath. In this manner it is continuously purified, and the bath at all times kept in perfect condition.

The plunge baths looked delightfully inviting; the water was clear as crystal; there was not one single, solitary soapy bubble on their wide expanses, nor the teeny-weenyest speck of floating dirt.

Every morning the bath bottoms are swept out with a broom of gigantic proportions.

Mr. Wilkinson informed me that in summer the bath water is maintained at an even temperature of 75 degrees, and in the winter months to 78 degrees.

"Can you swim, Mr. Bates?" asked my guide.

"I once tried my 'prentice hand and foot in the old North Street Baths; but something went wrong with the works. I dived in, shut my eyes, opened my mouth and drank so much of the contents of the bath that the water level was lowered by several inches. I've been shy of water ever since.

"Do you get many visitors on gala nights?"

"Rather. We have had as many as 1,700 spectators in this room on gala nights. It didn't leave much room for passing round; but everybody takes the packing in good grace, and there isn't much fear of fire breaking out at the deep end."

We went into the laundry. This room is high, light, and comfortable to work in. Two men were engaged washing linen. One of them possessed a voice with a tenor ring in it, and as he tuned his lyre he gave us considerable data in respect to certain physiognomical and pedal characteristics peculiar to his lady love, but absent in every other daughter of Eve.

The other was no vocalist. He shone in other respects; his arms having been converted into picture galleries. On his right forearm, starting from the wrist and extending up to the elbow was a beautiful tattooed representation of a bouquet of flowers, whilst his left arm held the perfect delineation of the head, face and bust of some fair charmer, whose flowing, unbobbed, raven tresses streamed well down towards his nieve. The manner in which these laundry charge d' affaires manipulated the towels and bathing drawers was nothing less than a feat of legerdemain.

Each piece of linen is boiled in the revolving dolly a full 20 minutes; they are then put into the rotary dryer and whirled round and round until most of the moisture is extracted; afterwards being placed three deep on the drying horses, pushed into the steam heated drying chamber and left there to dry off.

Under the baths by guide next conducted me.

In a cellar one naturally expects to find at least one corner given over to cobwebs and rubbish.

I looked specially for such a corner, but my quest was fruitless.

There were piles of tressels, a mound of boxes of soap, bags of Norwegian spar and other necessary impedimenta, but nothing out of place and nothing untidy. The walls and ceilings are beautifully whitewashed, and in the glare of the electric light looked white as virgin snow.

Some of these subterranean passages are rather low, so that it was wise at times to "duck" one's head.

The long alleys were crossed and recrossed with pipes of various dimensions for conveying water to the baths, bringing it away from the baths or for heating purposes. Nothing has been left to chance. There are three Matthew's steam heaters for maintaining the temperature of the bath water in

cases of emergency if the ordinary apparatus should break down.

Mr. Wilkinson informed me that the baths are emptied on the last Saturday in each January, and remain empty two weeks to allow for a thorough cleansing of all pipes and valves.

At the end of twelve months the water seems as clean as when first put in.

"What becomes of the bath water when you run it off?"

"It is directed into the town drains and helps to cleanse them."

"What is this huge box for?"

"That is our filter box, and though square, is much on the same lines inside as the ones at Barley, as you described in your article in the "Leader" of October 30th. It is flushed out every day, and annually is emptied, cleansed, repainted, inspected and overhauled.

"The filter pump runs seven days a week, 24 hours a day, in summer time."

"I reckon that's one of the hardest worked machines in Nelson. A machine that runs 168 hours a week will need your constant supervision."

"Do you have many accidents to bathers, Mr. Wilkinson?"

"I am thankful to say that we have had no fatal accident and only one serious accident. Bursted noses, bruised shins, cut heads, and heads with extra bumps are quite common and soon repaired. We think nothing of such minor accidents.

"This testimonial will give you the needful particulars regarding the one serious accident":—

BOROUGH OF NELSON.

The Water and Baths Committee of the Nelson Town Council do hereby record their appreciation of the meritorious services rendered by

MISS BESSIE ELLISS

and

MR. JAMES CONNOR,

who, on Thursday, the 3rd day of March, 1921, whilst fully clothed, entered the large Swimming Bath and rescued from drowning a man lying unconscious at the deep end of the bath.

Dated this 10th day of May, 1921,

Robt. Wm. Gibson, Mayor.
Edgar Boothman, Chairman.

"Did the man recover?"

"He did. We got a doctor to him as soon as possible. He was sent down to Reedyford Hospital, was kept there three days and then sent home.

"Yes; he's all right now. He plays the piano at one of the picture palaces."

Mr. Fred Wilkinson has been baths manager since they were opened in July, 1913.

PART XI.

THE BATHS, A FICKLE MAID AND A GALA.

Mr. Wilkinson, the Baths manager said "Come some Saturday afternoon and spend an hour with the lads; you'll see some fun. And when next we have a swimming gala don't forget to pay us a visit."

I selected my time, and on a certain Saturday afternoon paid my promised visit to the Public Swimming Baths.

On my way from the centre of Nelson to Bradley I was arranging in my mind the construction of a passage in an article I had in preparation. I was oblivious of the people in the street, the gaily decorated shops, and the rain that was generously falling.

A hundred yards from the Baths I was suddenly pulled up. I could hear a loud, confused roar; a mixture, as it were, of a dog fight, two opposition political meetings and a rowdy football match all taking place at the same time in the same area. Still, nobody in the neighbourhood seemed alarmed at the vocal turmoil. Lifting my eyes from the puddley ground and looking forward I found that the uproar came from the Baths.

Thinking some terrible tragedy was being enacted within I rushed forward to lend my aid to avert further calamity.

My effort was wasted.

The young ladies in the pay box were unruffled, the manager all smiles and the attendants placidity itself.

"Has something gone wrong, Mr. Wilkinson?"

"Not that I know of. Why?"

"What is the meaning of that horrible noise from the baths?"

"Noise? There's no unusual noise that I'm aware of. Why, this is a quiet afternoon!"

I gave up to the problem.

Mr. Wilkinson led me into the large plunge bath. About 50 lads were in the water and perhaps 20 promenading along the bath edge. They were all in very undress uniform.

They dived and swam, tumbled and tossed, held one another under the water, chased one another from the deep to the shallow end and across the bath.

They shouted until my ears ding'd with their shrieks, cat-calls, yodelling, whistling, shouting, clapping of hands, splashings in the water and slap-slapping of bare wet feet along the tow-path between the dressing boxes and the water.

Putting my mouth close to Mr. Wilkinson's right ear I shouted, weaver fashion, "That lad made a splendid dive, then. I wonder would he repeat it?"

In a tone of voice that would have been a credit to a trawler skipper in a gale, he shouted,—

"Pickles, do you mind doing that dive again, please?"

WINNERS OF THE BAXTER SHIELD.

Out of the bath scrambled Pickles, along the bath edge he ran, on to the diving plank he stepped, at its very edge he halted a tenth of a second to tense his muscles, then leaping high he dropped into the six foot six end as quietly and cleanly as would a plate slipped in edgewise. Scarcely a bubble did he raise or a ripple send across the water. It was a clean dive. Not to be outdone, his pal, young Tom Brown, also gave an exhibition of his skill in diving. It was good, but he lacked the artistic fineness of Tom Pickles.

Pickles' posing as he rose from the board and dived was a perfect exhibition of the swallow dive. I can, as I write, see his lithe form rise in the air, see the clean, pink skin, the slender lad's limbs, lean chest, flat torso, outstretched arms and spread hands as he dropped and slipped into the water.

Pickles and Brown dived again and again, swam lengths and breadths and seemed fairly to enjoy themselves.

At the shallow end learners were busy trying their skill at diving in, jumping from the tow-path, floating, endeavouring to maintain balance with the aid of rubber bladders and coming out to shiver.

Mr. Wilkinson does not favour rubber floats. He says they make learners too dependent on artificial means, and robs them of the necessary self-reliance.

Up in the gallery lads were busy struggling into shirts and trousers, divesting themselves of those useful garments, or drying themselves after their swim. The noise and racket was deafening and continuous. It was a dull, wet afternoon outside, but things were bright and lively under that glass roof.

Happy! Those lads were as happy as spring lambs in a field of daisies; they were as frisky as the minnows in Pendle Water when children are about with net and line.

Mr. Wilkinson took me into the small bath where a few young ladies and girls were disporting themselves in the water and along the bath sides.

I thought at the time, and think so still, that the young ladies did not put the same careless abandon into their sport as did the lads in the other bath. They appeared to lack "ginger" in their play; were too afraid of hurting one another. They seemed to be on their very best Sunday behaviour.

One young lady had not been in the water at all. She looked to be quite content to parade in cap and costume. They laughed and shouted, jumped in oftener than dived in and swam breadths. But I missed the healthy rough and tumble of sportive youth. Perhaps they were too conscious of the presence of two grown up men.

As I made my way home I thought if one can get so much fun out of a quiet (?) Saturday afternoon visit to the Baths, what a tremendous lot of pleasure ought one to get on a Gala night.

The gala night came. Preparations were well advanced when I arrived at the Baths office.

A man came in and asked for no less than 150 towels. As cool as you please, Mr. Wilkinson pointed to two mountains of linen, and said, "Take 75 off this bundle and 75 off the other one, and if you want more, there's plenty left."

A number of lads came romping in, laughing and shouting. They got their instructions in double quick time. They were competitors. Shouted the Baths manager—

"Now then, you lads, into that small bath you go, an' be quiet about it."

Somebody must have chained 'em down and muzzled 'em. I heard no more of them.

A young gentleman came into the office with a quantity of type written programmes over his left forearm.

"How much should I ask for these programmes, Mr. Wilkinson?"

"A penny apiece if you can get it; if you can't, sell 'em for a ha-penny."

On the sound business policy of sell at full value if possible; failing that, dispose at a small loss rather than have them left on hand to become a dead loss.

Visitors to the gala trooped in. Came little lads in pants that finished six inches above the knees and stockings that left off six inches below the os patella; came youths in gay spangled ties, holy-Willie collars, clocked socks and cigarettes; fatherly men and motherly women came to see their offspring compete, there were men in bowler hats, nebbed caps, mufflers and a spirit of curiosity, and young ladies attired in the latest millinery confections and dressmakers' creations. They came in clogs, boots, shoes, strap-overs, suede tops, Russian and rubber boots and buckle straps; high heels, low heels, flat heels, and rubber soles.

I took my place on a chair near to a dias under the clock at the deep end.

A double line of seating was arranged round the bath; a few forms covered with red drugget, bore numbers for reserved ticket holders.

The water in the bath, clear and flat, reflected the glaring electric lights, the people seated alongside and the line of visitors in the gallery. In the water they looked downside up.

It was quite a gay throng that occupied the seats round the shining pool. Young ladies discarded hats and coats. In that warm room, under the dazzle of the electric lights, their jumpers, red, pink, green, saxe, yellow and blue; their stockings, flesh tinted, putty, marl and grey; their skirts of varied hues and designs; their hair long, bobbed, shingled, waved, dinted, faintly perfumed and lightly touched with liquid brilliantine, done up in the latest fashion plate coiffure with ornament of sparkling slide, jewelled comb and dainty ribbon, made the scene one not to be easily forgotten.

There was not much chatter going on (Mr. Wilkinson had evidently put the frolicsome lads in the deepest dungeon); but just a low hum of talk, ripple of laughter and gaiety of happy smiles.

I do not know how old the veteran of the assembly would be; but probably the youngest attendant, a lady, aged three, was seated behind me.

She had light flaxen hair in long curls, tied with blue ribbon made into a bow; her eyes were speedwell blue; her face was pale with the faintest kiss of pink on each cheek; her lips were holly berry ripe, and her smile was almost as dazzling as the lamps hanging from the roof.

She had pulled off her hat and coat, the better to display her ruby dress, brown leggings and shiny shoes.

Then the gala commenced with a 50 yards ladies' handicap. There were four competitors. In size they ranged from 3ft 4½in. to 5ft. 3½in. The little girl at the end stood erect until the starter blew his whistle to demand attention. Then she put her hands together, leaned well over the water, and at the word "Go" slipped into the six foot six as easily as a trout descends into the stream after having leapt to a fly.

It was a good swim; plenty of splashing, working of arms, feet and legs. They all got a shout of praise from their friends on the forms and the lads in the gallery.

The real fun came on when the schoolboys took to the water. After being unchained they stood in a row at the bath edge. One by one, and at intervals of a few seconds, they dived in. From the "gods" up above, and the youth on the forms below came shouts of "Go it, Breawn," "neaw then, Pickles," "Good lad, Bowler," "Buck up, mon, don't thee stop to read th' last Pink," and similar war cries. I wonder the building stood the racket.

You never saw such response to so hearty encouragement. The water became a seething maelstrom. It was difficult to tell where one swimmer began and the other left off. It was one wild flurry of whirling arms and legs and turmoil of water.

And what with the splashing and dashing, the overhand strokes, the crawl, trudgeon, paddle wheel and dog swim, combined with the hullabaloo from the "gods" on "Mount Olympus," we were having a giddy, hectic hour and getting "full vally" for our money. Aye; but these lads did better than well. There were lads of sorts there, thin, stout, flat lads; lads in the leggy stage, and lads with bones well padded with muscle and tendon. But thin or plump they went at it pell mell and nearly emptied the bath on to the spectators.

Some of 'em won; some didn't. Those who lost knew that better swimmers had beaten them and took defeat with good grace; those who won carried off the palms of victory with a modesty becoming heroes.

The most scientific exhibition of natation that evening was given by a young lady.

She came and stood at the deep end of the bath attired in blue cap and swimming costume, with a white bath towel wrapped round her.

Mr. Wilkinson introduced her to the audience. Said he, "Miss E. Peacock is about to show you how easy it is to swim and how difficult to drown. She will show you how to make the water keep you up; how to enjoy the pleasure of swimming; how to get the greatest benefit from it and so enable you to render help in case of necessity."

The young lady dived in. I was making a note at the time, and though she was only a yard away I nearly missed the action, she dived in so silently and easily. She made scarcely a bubble and not much of a ripple. Swimming certainly is easy, as she does it.

"Get into th' middle o' th' bath, Ethel," said the manager.

She went through various evolutions; back stroke, side and breast stroke, walking the water, going round and round like a wheel laid flat, propeller action and clock pendulum movement.

This latter got her the applause it had earned; and the applause was in no wise stinted in measure.

Then came motionless floating, and after that the torpedo action. Now this was quite spectacular. Miss Peacock lay flat on the water; steadying herself she gradually depressed the whole of her body except for her feet. Her right foot rested on the instep of the left and projected a few inches and the raised wet feet looked like a pink periscope sliding along the surface of the bath. Then we had the "Mermaid's Prayer," followed by a breadth feet first and the somersault.

This last delighted little blue eyes behind me; she laughed and shouted and clapped her hands, and turning to her mother said, "See, mummy; she's toppling her tack-tail."

A most useful exhibition came next. Two swimmers enacted the parts of rescuer and rescued. In the water they showed how a drowning person who clings wildly and frantically to his rescuer can be released and got safely ashore. The rescuer brought his victim to land after he had been nearly drowned, after he had tried to drown his rescuer, and after he had been seized with cramp.

I appreciated this exhibition because twice I have had narrow escapes from drowning.

During the interval the President of the Swimming Club, Councillor J. H. S. Aitken, came and took his place under the clock. It was at that moment a striking incident took place which proves the fickle nature of women. Little blue eyes, aged three, came and stood by my knee; she shook her ringlets at me and permitted me to put my arm round her and cuddle her to me. She went so far as to tell me her name was Jessie, that she was with her mummy, and that she would be four next birthday.

We were getting along very nicely and arranging things to our mutual satisfaction when she noticed the President, when immediately she off with her old love and on with the new. The President, who is a more experienced hand than me at cross examining people, wormed from her youthful bosom the darksome secrets of her juvenile past.

Fortunately the gala was resumed, otherwise what might have proved a local problem of the eternal triangle was, like Boyle Roche's rat, "grasped by the horns, nipped in the bud and strangled on its nest."

Attendants came and fixed linen covers over the knees of those who occupied front seats. Polo players came, dived into the bath and began to fling the ball about. It bounced to the feet of little blue eyes; she ran to pick it up; it eluded her and dropped back into the water. Blue eyes in her eagerness was rushing to catch it, and but for a young lady on my left in Russian boots, brown skirt, brown jumper, brown hair and eyes, clutching her by the ruby skirt, blue eyes would have dropped into the bath at the deep end.

The President addressed the audience. In a few racy, well chosen sentences, he spoke heartily about the gala, its aims and objects; he hoped that this effort on behalf of the funds of the Football Club would serve as an encouragement to others who were working on behalf of its interests, and that not only would the £3,000 be obtained for which they set out at first, but the £5,000 towards which they now aspired.

Exhibitions of swimming followed by amateurs and professionals who have won a wide and deserved aquatic reputation.

The last item was a polo match, Old Trafford v. Nelson. It was a most enjoyable match; both sides fought hard, fought nearly as hard as the lads in the gallery shouted. As was to be expected the best side won.

I remarked to the President that the "gods" possessed good lung power. He smiled, and said:—

"They're rather on the quiet side tonight. You ought to hear them when there's a school gala on. It's pandemonium then."

I think now about those splendid boys and girls, youths and maidens, who showed us their skill in the water. I marvel at the fine specimens of each sex as I saw them on the bank at the plunge.

The alertness, the nervous tension and physical strain as they waited for the count; the clean fight to win, the glorious struggle to out-race each other, the ecstatic thrill of such as were first at the winning mark, was a tonic to me to behold.

One remark Mr. Wilkinson made to me I shall long remember. Said he:

"There was a time, Mr. Bates, when a young woman who attended a public swimming bath was looked upon as not being quite as good as she might be. But that feeling has died out now. Women come to learn to swim, and when they have learned they come to enjoy swimming."

Mr. Wilkinson's statements were afterwards borne out by Mr. W. E. Watson, chairman, and Mr. E. Holt, the corresponding secretary.

Mr. Holt informed me that in the Nelson Amateur Swimming Club there are 153 lady members, senior and junior, and 196 gentlemen, senior and junior; that the subscription of ladies is 1/6 seniors, and for juniors 1/-, and for mere males 2/- for adults and 1/- for youths under 16.

" Now, Mr. Holt, if they can be admitted to membership on such easy terms, what are the charges for tuition?"

" The subscription includes tuition."

All I can say to that is " As they're gettin' summat for nowt."

Mr. Watson added " As a club we aren't out to make money; we're out to make swimmers. We can't carry on without money, only we don't hoard it when we do get it. Our surplus helps to send competitors to other towns to try their skill against their equals and better swimmers.

The Polo Club has been active since 1920, and has proved a success. Mr. Holt stated:

" In 1920 the Polo Club got to the semi-final of the Lancashire Junior Championship. In 1921 they again reached the final, but were beaten by Wigan Reserve at Colne. In 1922 they reached the final at Blackburn, defeating Toxteth, winning the Lancashire Junior Cup. In 1923 they were able to enter the senior competition owing to having won the Junior Cup.

In 1923 the polo club was successful in winning the Lancashire Senior Shield at Wigan, beating Southport, 7—6, after extra time. That was a hard fight. The polo club created a record by winning the Lancashire Junior Cup in 1922, and the Senior Championship Shield in 1923."

" Any other successes to the club's credit, Mr. Holt?"

" In 1923 we were successful in reaching the final in the Northern Counties Junior Championship; in 1924 we reached the final in the same competition, beating Tyldesley Reserve at Burslem.

We have not been quite as successful this year, owing to losing Chapman, our only player who has received International honours, and others of the team being indisposed."

" Any more facts, Mr. Holt?"

" N. Chapman received his first International Cap in the game against Ireland at Cheltenham. He was also the first reserve in the International Match, England v. Scotland, at Glasgow, last year. G. Foley, captain of the polo team, and H. Rycroft have both played for the Lancashire County, second team, this season.

Our instructor, Prof. F. Swinnerton, is just the man to teach nervous swimmers; he has skill and tact and is as patient as an old hen.

Mr. Fred Wilkinson is on the Northern Counties Executive, and also a member of the Education Committee whose purpose is to teach and train young and promising swimmers. Nelson is a centre for such training, and they come here from Colne, Burnley and Accrington."

As Mr. Wilkinson knowingly said, " We are doing a good work here; we want this work making public, and if the " Leader " can draw attention to our efforts we shall be very grateful to it."

The Swimming Club issues a splendid syllabus of events and a useful code of rules.

PART XII.

WALVERDEN FISH HATCHERY.

It was Mr. Rodwell, the Water Engineer, who suggested the visit to Walverden; he also undertook to arrange for Mr. Varley, hon. secretary to the Fishing Club, to accompany us.

We met at the Engineer's office, and had a quiet informal chat whilst waiting for the car to take us up to the hatchery.

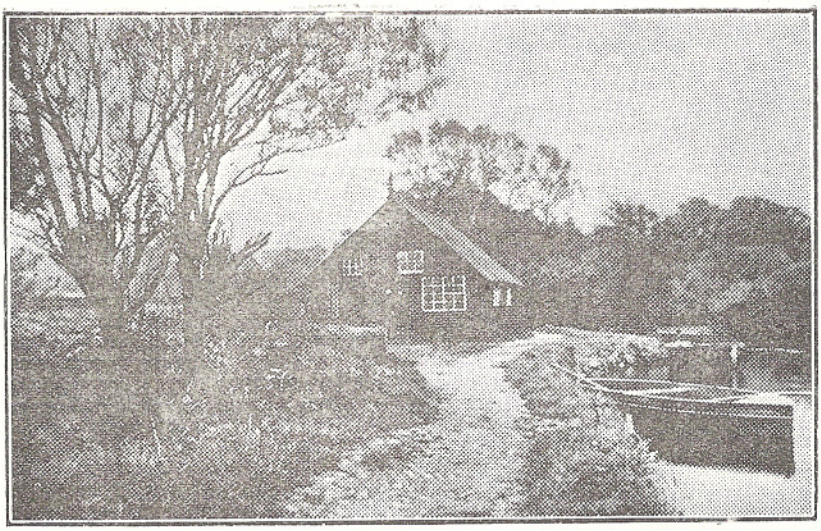
Naturally, we talked about fish, and one cannot long be talking about fish and their habits before the conversation swings round to the fish's natural enemies, disease, birds, semi-aquatic animals and poachers.

One little matter excited quite a lot of interest: Does a hooked fish feel pain? Mr. Varley thinks it does not, and advanced many arguments to prove his contention. But with all his arguments he failed to convince me. He says he has known a fish to be hooked three times in as many minutes in the same pool, which he thinks is proof that that particular fish felt no pain from the hook. To me it indicates hunger or lack of intelligence on the part of the fish, and not proof that it feels no pain.

Mr. Varley stated that a hook in the jaw of a fish causes little or no pain; that often it is no inconvenience to it; that it can swim around on getting rid of the obstruction. He gave us to understand that fish have some means of getting rid of a hook, but is not quite sure by what method. But that they can free themselves from such things he knows to be a fact from personal observation.

" Now," said he, " when a fish snaps your hook and the barb fixes itself in its jaw and you begin to pull on the line, that has some effect on the fish. It feels its liberty is in danger of being restricted, the sensation is unusual to it; its movements get a sudden jerk; it is being compelled to do something it has no desire to do; it has ceased to be a free agent." Those were arguments I could not gainsay. But the hook or barb in a fish's mouth, does it really cause pain? On this depends the ethics of angling. The jaw of a fish is not quite as sensitive as the lobe of the human ear. Men and women have their ears pierced so that they may hang ornaments from them. Apparently there is no discomfort. But pull very gently at my lady's earring and you will soon bring her to a standstill with a yell of pain.

The fish is in exactly the same case with a hook in its jaw as is the lady with the ring in her ear. Pull never so gently on your line; cause the fish to have its attention drawn to the presence of the hook in its jaw, and a set of sensory nerves are excited that cause it to resent the pull upon it. The fish feels bound to pull in an opposite direction from you, and the more it pulls and the firmer you hold your rod the more intense is its sense of feeling pain.



THE HATCHERY AT WALVERDEN.

"Some people," said Mr. Varley, "seem to think that fish lack intelligence; but old anglers know that they possess a certain amount of commendable powers of reasoning. A trout can tell a horse or a cow from a human being by the manner in which they walk. Often a trout can distinguish a man before it sees him, and will vanish into its hide before the man can get a glimpse of it."

I know that people do not give what we term the lower creation sufficient credit for having intelligence. That dogs can reason any dog lover knows, and can quote abundant proof for his contention. Like human beings dogs love intensely and fiercely; they will protect their master and his property with their lives. They are faithful even unto death.

A well trained sheep dog knows its own flock, and will pick out a strange sheep from a flock of a thousand.

Dogs lead the blind, track the villain, and during the war proved of invaluable service; one at least being awarded a "Canine V.C." We very glibly term their reason instinct. I do not know what instinct is, nor have I yet seen in print nor heard expounded a clear definition of its meaning. I know that fishes do not reason after the manner of human beings. They cannot grasp our point of view, though it would be well if occasionally we tried to look at things from theirs. In times of danger a fish often has to decide in a fraction of a second what action to take to find safety and elude capture. Mr. Varley pointed out some of the enemies fish have to face and by their wit circumvent.

A fish has many enemies. The kingfisher, seagull, and heron are perhaps its worst enemies locally. An otter is an enemy to a trout preserve; but whilst not unknown are not common locally.

Another enemy the fish has to try its wits against is the poacher. As Mr. Varley said:

"The man who by his skill and cunning lures a trout into his hand, though a poacher, is entitled to some respect. He has done something for what he gets, but a man who 'chemics' a stream deserves horsewhipping. He puts into the water that which kills not only the trout he is after, but it also kills the natural food on which the trout lives. 'Chemic' kills all manner of life, the trout, minnows, roach, sticklebacks, snails and small forms of animal life on which they feed. Such sneaking folks use neither sense nor reason and deserve horsewhipping."

Mr. Varley's strong words have bitter experience behind them. Too often have the Walverden waters been "chemiked"; and only a lazy dastard would resort to such low-down tricks. Such people, when caught, ought never to be let off with a fine. Such scamps are often members of a poaching club. There used to be one such club in Nelson years ago, and I well remember two of their number being smartly fined for "fuddling" Twiston stream. I saw the dead trout floating down the beck soon after the water had been so callously poisoned. The great drawback was the fines were paid. Naturally, Mr. Varley being a sportsman, detests such debased means of obtaining fish. Trout so caught, though fit for food will not keep long. Fish possess a delicate nervous organism, and are bound to suffer great pain from the asphyxiating and burning effects of chloride of lime.

The man who "tickles" for trout is something more than a poacher. He is a naturalist of sorts. He cannot obtain fish by his

methods unless he has some knowledge of natural history. He learns, by close observation, where the likeliest fish are to be found; he approaches the spot with a care and caution that would be a credit to a Far West trapper or North American Indian. He moves with a slow sureness and precision that are remarkable; he treads lightly as a mousing cat, never swings his arms, never wears striking apparel, never stamps his feet, lies down by the selected pool with a caution that ought to win him a medal, puts his hand in the water as carefully as a doctor feels a pulse, and when his fingers are under the fish he moves them along its silvery belly in a movement as accurate and delicate as beating time to a slow musical movement, thus raising the fish gradually to the surface of the water, when, with a quick jerk of the hand he flings the fish to land. Such a poacher is no mean artist. Compared with the man who fuddles preserved waters the trout tickler is a saint. But any fool can fling chloride of lime into running water. Those who net streams and so catch fish wholesale are a great danger to such as lay out great sums of money in stocking streams, rivers and lakes with fish.

Apart from poachers fish risk disease. One of the most vital scourges in a fish's life is fungus. In the earlier stages fungus is often bad to detect. It begins as a tiny spot on the eye or gills, and in the one case brings on blindness and in the other death by suffocation. Against fungus the fish is of itself helpless. It is a disease that spreads rapidly and affects like a blight.

These were a few of the matters we discussed whilst waiting for the car to run us up to Walverden. As we approached the reservoir our driver took the car down a steep embankment, along a narrow, rutty, puddly, pot-holed, ashed road, close to a stream side and near to a goit.

Leaning towards me Mr. Varley said: "It's surprising where they can get with a Tin Lizzie."

"Wait until you've been driven by Jim as often as I have, then you'll know. If nothing stops him he will drive along the footpath, through the iron stile, on to the top of the reservoir embankment, and do it as calmly as you please."

Walverden reservoir is roughly angular shaped. Surplus water rushed from the overflow into a deep, pooly runway; across the exit extends a long screen of fine-mesh wire netting to prevent fish leaving the reservoir. At its deepest part this water is about 56 feet deep. A narrow path runs between boundary wall and reservoir. Along the bankside, on the flat faces of sunk blocks of stone, were numerous specimens of the wandering snail (*limnea pereger*); in the middle of the reservoir some kind of water bird was floating. Faint, wintry sunlight tinted the water, ruffling long fawn and pale green stretches; the wind drove along, beating the water into choppy waves which, washing against the chiselled boulders fell in showers of glistening drops.

Under the boundary wall, midway along the embankment, is a fisherman's hut, where the angler may sit and smoke whilst the barbed worm lures the innocent trout.

Near to the head of the reservoir are two buildings, a hut and a hatch house.

The hut is really the anglers' club room. It is large, roomy, lofty, and almost square. The floor is of smooth concrete, with a stove in the middle. All about are arm chairs, many of them old fashioned spindle backed ones; buffets, with a finger's width cut out to make it easy to carry them about, single chairs and a long upholstered form under the windows. On hooks fixed in the beams are rods and lines, landing nets, bait tins, fish baskets and sou'westers; from other hooks are suspended long coats, mackintosh's, overalls, caps and oilskins. There is a big table on which are spread out a set of well used dominoes, the "Fishing Gazette," and a copy of last week's "Nelson Leader."

There seems to be every convenience for anglers to dine in comfort. There is a small mirror—the only object suggestive of vanity—on the wall and close to it a humorous fishing picture.

"This hut used to be the boat house when it was under Ecroyd's, who at one time had the fishing rights," said Mr. Varley.

The question was put to Mr. Varley: "Do fishermen tell the ter-ewth, the whole ter-ewth and nothing but the ter-ewth?"

He blushed, as would a modest maiden at her first party, and answered, "Fishermen are very truthful."

Our smiles made the rafters shake.

Taking a key from off a hook, Mr. Varley led the way to the hatchery. On the left of the path is a long, shallow goit of water, pebbly at the bottom, well supplied with American pond weed, water loving mosses and a few sprigs of watercress. The water is clear as crystal, comes from a spring in the hill side about 80 yards away, and Mr. Varley has never known it to freeze. This goit is so arranged that it can be divided into sections without much trouble.

The hatchery contains a number of breeding troughs, into which, night and day, fresh spring water flows. In two of the troughs were trout ova or eggs, which are kept just below the surface of the water on a riddle of glass rods. Most of the eggs had hatched out, but there were a number in the transition period, and it was interesting to see the fish, or avelins, as the young trout are called, ready to drop through the grid into the deep trough, there to take their chance with the thousands of others wriggling about. The newly hatched fish are a pale golden colour. They retain the yolk sac, which is food, for a period of about six weeks, after which they are termed fry. The average period of hatching is 60 days, though a cold spring will delay the process. Fertile eggs look like amber beads; unfertile eggs turn an opaque white, and generally rise to the surface of the water. The eye is the first point to ap-

pear in all avelins, and shows at the end of two or three weeks. The fish in one of the troughs hatched out in the first week in January.

Mr. Varley explained the methods by which hatching can be retarded and ova sent from England to any foreign country. In the former process ice is kept in the water, and for transport the eggs are carefully packed away in ice.

During the period of incubation the eggs are kept under cover to prevent a too free admission of light. In the second trough were about 5,000 wrigglers that had been hatched out about three weeks. In most of them the yolk sack had been absorbed. The healthiest fish kept close up to the end of the trough where the water entered. A clear case of "the weakest to the wall and the devil take the hindmost"; also it illustrates the old axiom, self-preservation is the first law of nature."

"What do you use those acetylene lamps for, Mr. Varley?"

"When it is spawning time, we go up the beck with them, light them, and throw the beams on the water, the glow attracting the fish. We pick out the she fish, and if they are full of ripe spawn we gently squeeze it out. A three-quarter pound she trout will spawn 1,000 eggs; 90 per cent. will hatch out in the hatchery, but in a stream, on account of natural enemies, not more than 5 per cent. will reach maturity. The greatest enemy fish have to contend with is fungus.

"How many fish will you have in these troughs?"

"Eggs and fish will total up to about 25,000."

I took his word for it. Had he told me they were as the sands on the sea shore for number, I would never have disputed the claim.

The dead ones have to be taken out as well as the fertile ova. Mr. Varley tickled the fish with a long white feather, and each and every one of them exhibited a lively Kruschen movement. In one of the tanks some of the avelins were spinning round, head to tail, after the manner of playsome puppies and kittens.

Said Mr. Varley: "The safest method of stocking a preserve with trout is to obtain yearlings. It's very expensive in the first instance, but by then the fish are a fair size, and are able to withstand many of their enemies, and there are not near so many deaths from disease.

In Walverden it will take a trout three years to reach nine inches in length, and that is the minimum size for catching on our preserve. At that age a trout is worth about 1s. 10d. on the market. We join with the other clubs in making purchases of yearling trout. We can save money by buying large quantities, so that one club helps another. The largest trout caught in Walverden weighed 3¼ lbs."

Mr. Varley said that many strange and rare birds visited Walverden. He named a few, but I hesitate to broadcast what particular species he enumerated, as I have no desire to encourage visits of the man with a gun and an insatiable itch for shooting things beautiful, rare and useful. Whilst we are talking on this matter I drew my guide's attention to the presence of one of the rare kinds he had named.

It seems that some time ago a crested grebe was shot on this water. Such a bird is of no earthly use as food. Also it is a law protected bird. About here it is rare, which is all the more reason why it ought to have been left unmolested. Herons, Mr. Varley strongly objects to where trout are preserved. He racily described a few of their habits, as follows: "They fly down to the water's edge, wade in a short distance, raise a foot and stand on one leg. They never seem to move a muscle or flutter a feather, until some fish, perhaps a trout, of a foolish and too confiding nature comes hovering around that spindle leg; then, as sudden as though loosed from a catapult down goes the head, the beak opens, closes with a snap, the trout is caught, the head thrown back, and exit *salmo fario*. There are no missings. A heron will gobble up as much as 40 minnows and roach or a dozen trout a day.

I told Mr. Varley about being present at a post mortem held on a heron a few weeks ago. The bird, an old cock he was, and tough as indiarubber, had been shot on Foulridge reservoir. There was a trout in its mouth, one part way down its gullet, one in the stomach, and a chymified one passing out by the pyloric valve into the duodenum.

In some waters roach, dace and sticklebacks are afflicted with a small tape worm about an inch and a half long. The life history of this parasite has yet to be investigated and written out. Much mystery attaches to it at present. It has several "hosts" three of which are known, but the most important "host" has yet to be discovered. Experiments have been carried out at Colne, but up to now with little success. Fortunately it does not attack trout with the same violence that it affects smaller fish. The pest is unknown in Walverden waters.

Walking along the water's edge whilst Mr. Varley and Mr. Rodwell talked business, I played Robinson Crusoe, and on the sands between the grass and the water, discovered the footprints of a heron, a water-rat, a large dog and a small dog. On small flat stones I found many specimens of the fresh water limpet, a tiny snail, but an interesting one.

There was a chaffinch in a tree near by, a throstle singing in an ashtree beyond the boundary wall, a dog barking up at the farm, and a grey barred cat, with golden eyes, crouched on the grass near the low bridge.

Mr. Varley was anxious I should miss nothing; he was most painstaking in his explanations, and I have pleasure in tendering him "Leader" readers' thinks.

PART XIII.

THE OFFICE.

On our way back from Walverden I mentioned to Mr. Rodwell that I had not, as yet, taken an inventory of the Water Office. I remarked that I was sure the thoughtful public of Nelson would like to know what was done in the office, what kinds of instruments were necessary to transact waterworks business and how they were used. I felt positive they would be interested in reading particulars about the records of the reservoir gathering grounds, the various filtration plants, service reservoirs, trunk line and distribution pipes as well as information about the preparation of maps, drawings, etc.

"You know, Mr. Rodwell, when a ratepayer comes to the office and sees on the other side of the office window a young clerk with a H.B. pencil behind his ear, a fountain pen in his left vest pocket and pensive brow bending over a typewriter, that, like the heathen, he imagines a vain thing if he conciudes that such items are all the needful and necessary apparatus for transacting such a stupendous undertaking as the supplying of a vast area and population with pure, unadulterated, full proof Adam's Ale. So please will you enlighten us?"

"I will do my best. Come on to the office this afternoon and we will "take stock," only don't expect any comic turns. There won't be any in this act."

When I arrived at the office the first thing I noticed was a man at the inquiry window. He was making a complaint, forcibly and volubly. He vowed he would pay no rates until what he required altering had been thoroughly repaired. He was going at the earliest opportunity, to lay his complaint at the feet of the gentleman who represents him on the Council; from that harassed gentleman he would work his complaint up to the Baths and Water Committee, and should they fail him he would finally seek audience of his Worship the Mayor.

I listened, not a little amused, at the man's complaint, and, listening, wondered whether his complaint was that of too much water or too little. No doubt by now his ruffled feelings will have been soothed and the pipe repaired.

The youth whose duty it is to faithfully register all complaints is already showing signs of wear and tear and age; his dark brown eyes have a weary far-away look; his step has lost much of its laddish alertness.

I stepped into Mr. Rodwell's office, and the first object that caught my eye was a large map in a broad, polished frame, occupying most of the space between the mantlepiece and the ceiling. This is one of the most important articles in the office and will bear close inspection from me and considerable explanation from Mr. Rodwell. It is, in essence, the water chart of the Borough of Nelson and surrounding district, and is a bank of vital, statistical information, and Mr. Rodwell was most painfully carefully in elucidating its every needful point. He said: "This map includes all our statutory area of collection and distribution of water. It extends from the left hand, which is the west side of Pendle Hill to the right hand side, which is the summit of Bouldsworth Moor. Nelson is practically in the centre of the map.

"This map is on a basis of 6 inches to the mile. The houses are in shaded block, and churches and all public buildings in black.

"On this map are indicated all trunk roads, country lanes, occupation roads, field and meadow paths, farms, wayside cottages, walls, woods and places of archeological interest. It also indicates all streams, becks, rivers, mill-lodges, goits, reservoirs and other waterflows."

"What does that heavy red line indicate, Mr. Rodwell?"

"The boundary of the area of distribution. The approximate population in that area is 65,000, about 25,000 of which are outside the Borough of Nelson."

"Um! I hope you've included me in the 25,000, Mr. Rodwell. I want to feel I'm on the map. The rosewood polished frame which holds the map looks solid and massive."

"It is. That frame is made up of three pieces; the frame, a loose middle section and a fixed back. At this right side here are two concealed handles which enables the middle framework, on which the map is mounted, to be withdrawn without disturbing the base or outer framework."

"What purpose do these red and blue topped pins serve?"

"You will notice that the red topped pins start at the filter house at Ogden reservoir and denote zones of pressure from that source of supply. The blue topped pins lead away from Coldwell filter house and denote the main supply of Coldwell water into the town. As you can see the drop from the high pressure zone into the low pressure zone is indicated by this thick green line."

"Some of the red and blue pins I notice run parallel with each other. Why is that?"

"That is so. That points to the particular areas which can be supplied by either Ogden or Coldwell water or a mixture of the two."

"For what purpose do you divide the town into zones?"

"For the prevention of waste of water. Owing to underground bursts it is advisable never to have an excessive "head" in any portion of the area supply, and as top water levels of the various reservoirs vary considerably it is necessary to so balance the water pressure by the constant regulation of flow from the filter houses as to prevent the accumulation of pressure at any one particular point. By the division of the area into suitable zones this can be done quite systematically and becomes almost automatic in its action."

"Why almost automatic, Mr. Rodwell? A lot of people—I speak as a layman—suppose the water is allowed to chase itself

through the pipes; that all they have to do is to turn on the tap and allow the water to flow?"

"That would be comparatively near the truth if everyone in the town drew the domestic supply in strict rotation so that at no time of the day was the flow from the filters either increased or diminished. But such a case would be an impossibility as almost all the works in the district commence operations at the same hour and cease within a few minutes of each other. Also thousands of domestic taps are turned on at meal times and create a flow equal at times to that consumed by the mills. There are, however, periods of the 24 hours during which the demand is very small, and during those periods, as well as week-ends and holidays, the pressure within the mains rises considerably. You will therefore see that the governing of mains' pressure by the suitable adjustment of control valves introduces the primal element of the turncock-inspector, as the action under all circumstances cannot be entirely automatic."

"But for this control would there be any likelihood of damage to pipes and valves?"

"Undoubtedly there would be, as it is possible to have a pressure of more than 600 feet in the mains in the lower reaches in the area, and that with such a pressure water-hammer action can be set up, causing a "knock" pressure of several hundred pounds to the square inch."

"What does water-hammer mean? Is it what one hears when warm steam enters cold pipes?"

"It gets its name from the noise as of a series of sharp resounding knocks within the pipe, and there are a number of causes, principal of which is the sudden closing or part closing of the draw-off valve or tap, or the presence of a pocket of air within the pipes."

"Has this a damaging effect on the pipes?"

"Under certain circumstances it has. Where the pressure is large and the oscillation capacity of that portion of the main is in sympathy with the pressure, the reverberations tend to get larger, especially where aided by the rise and fall of a ball in a ball hydrant, or on the ball float of a large cistern. This steel pipe (which, by the way, was removed from a main outside this area), had this hole blown through entirely by the effect of water-hammer."

Here, Mr. Rodwell directed my attention to a short piece of steel pipe 8in. in diameter and nearly $\frac{3}{4}$in. thickness which appeared as if it had had a number of explosions taking place inside it.

"The buzzing noise one sometimes hears in a domestic water service; is that caused by water-hammer?"

"It is, but on a small scale. All ordinary pipes are tested to withstand this, and one very rarely hears of pipes being fractured on account of this alone.

"This recording instrument, which you see upon the wall here, points at once to any water-hammer within the neighbourhood which is likely to be damaging to the mains. It is as sensitive as a seismograph, and immediate action is taken by our inspector in charge when he hears it giving its warning note to locate the seat of the trouble and take what steps are necessary to put matters right."

"Could a burst in the mains be one source of this trouble?"

"Indirectly it could; and bursts are often traceable by the effect of water-hammer, and generally speaking the 'noisier' the burst the easier it is to find."

"I suppose there will be underground bursts difficult to find?"

"That is so; especially where the fracture is a wide one and where the water is getting away into soft ground or into the open fissures of rocks."

"How are such bursts traced?"

"On a trunk main line which is under suspicion pressures are taken all along its length, and a hydraulic-gradient section, such as this one, is made to a large scale."

(Here Mr. Rodwell produced a long sheet of drawing paper, on which were various coloured lines and Tut-ankh-amen hieroglyphics, denoting pressures and losses of hydraulic head at various points).

Continuing, he said, "At this point you will see, Mr. Bates, that the red line of static pressures falls considerably, and in the particular test to which this relates it was assumed that water was being lost in considerable quantity somewhere between these two points.

"Testing with the stethoscope—which is in the corner there—failed to give results, but this more sensitive instrument, which I have here and is called a microphone detector, quickly traced the seat of the trouble, which was found to be a long fracture in the pipe, caused by underground subsidence."

"Those horizontal and vertical lines on the map will hardly denote water mains, Mr. Rodwell?"

"Quite right, Mr. Bates. You will notice that these lines run due north and south and east and west, forming rectangles 9 inches by 6 inches, and if you come nearer you will notice small red figures, such as this one, LVI—7, in the top right-hand corner of each square. This particular square shows the densest part of Nelson, almost in the centre of which you see the Town Hall, Market Hall and the Railway Station."

"Why is one part of the identification number put in Roman numerals and the other in ordinary figures?"

"The first part of the number denotes the particular division of the county map. For purposes of the Ordnance Survey the county is divided up into sections six miles wide by four miles from north to south, which in a scale such as this makes a map 36 inches wide by 24 inches high.

"The particular division in which the larger part of the Borough of Nelson is found is numbered LVI; but for convenience these maps are divided up again, each into 16 portions, denoting an area $1\frac{1}{2}$ miles from west to east and 1 mile from north to south.

The second number denotes one of these 16 sub-divisions, and for distinctive purposes is written in ordinary numerals. Each of these 16 portions is issued in a large scale, which is exactly 1-2,500th of the actual size, or 208 1/3 feet to 1 inch. Here is map LVI-7 on this larger scale."

"I notice you have considerably more detail on this map. Why you even show the width of footpaths and railway lines, which is certainly going into detail."

"Yes; on this map we are able to show all mains, including distribution pipes, down to 3 inches in diameter, which is the smallest recognised as a Corporation main."

"I notice that this map also is divided into rectangles."

"Yes; but in this case there are 25 instead of 16, and, as you will see, for purposes of convenience these are given a distinctive letter instead of a number, although the Ordnance Survey Department number these also."

"Are these, too, shown on an even larger scale?"

"Yes; two larger scales are employed; one exactly double the 25 inch size; that is, 1-1250th of the actual measurements. On these plans, all of which we mount on separate pieces of 3-ply wood for convenience in handling, the inspectors of the department keep all data relating to positions of mains, valves and fire hydrants."

"What with the figures, letters and squares, this strikes me as being a mix-up of a cross-word and a jig-saw puzzle. Has one to pay an entrance fee if one tries to solve it?"

"Ha, ha. Quite a good simile, Mr. Bates; but if you try you will find the problem easy of solution. No, there's no entrance fee; nor will you get a watch, a fountain pen or a cake of shaving soap awarded for a correct answer by return of post."

Mr. Rodwell fetched out from a drawer several sections of 3-ply wood on which were mounted portions of map. I was requested to arrange them in correct position, which I did on a gigantic drawing board a few sizes less than a billiard table, which stands in a recess near to Mr. Rodwell's desk.

"Why, Mr. Rodwell, these are quite easy to handle. In fact a schoolboy might play with them with interest and advantage and learn valuable lessons in local geography."

And here I would like to make a suggestion in the interests of the Nelson and district day school scholars. These maps of Nelson and district are tightly packed with geographical data, and I have no doubt whatever that if a few lads from any of the local schools desired to inspect them but what Mr. Rodwell would be only too pleased to exhibit them and explain their importance. In that case it would be advisable for such parties to make arrangement beforehand with Mr. Rodwell at the Water Office in Every Street.

A knowledge of local geography would prove advantageous to any boy—or girl either—living in this most interesting and historic district, it would teach him much regarding its conformation, create in him a desire to learn something of its history, and foster within his bosom a deep love of his native Witchland heath.

It is one of the most interesting corners on this earth. Its geology is a life's study; a knowledge of its flora-fauna is an acquisition to all who delve into its mysteries; here the sun shines by day and the moon and the stars by night, and quiet contemplation of their glories will thrill the bosom of the loving observer with feelings as deep and with reverence as profound as ever stirred the finest aspirations of poet, artist or philosopher.

The life history of the commonest Pendle Forest hedgeside snail is as full of engrossing mystery and scientific interest as is that of the elephant of the African forest or the tiger of the Indian jungle; and an intimate acquaintance with our local uplands, valleys, moors, lanes and paths ought to provide any adventurous lad with as much healthy excitement as is needful for him and at the same time store his mind with a fund of geography that he will ever remember with gratitude and pleasure, no matter where Fate in after years may lead his steps.

"Now that you have put those sections together, Mr. Bates, you will see how simple it is for members of the staff, including our inspectors, to refer to tests or repairs made in any portion of our area of distribution. The largest scale employed is used on the town maps only; that is 1-500th of the actual size, or five times as large as the squared up plan over here. This plan, for instance, numbered LVI-7-H, is exactly the same size as the 25 inch Ordnance Map, but shows streets and buildings contained in rectangle H, which as you will observe, is 1-25th part of that map."

Here one of these maps was produced, showing the area between Carr Road and Bradley, including the Town Hall, Scotland Road, the Gas Works, Public Baths and several important mills and public buildings. In this map the minutest detail is included, down to the exact position of every fire-hydrant and stop valve, as well as every lamp post and street gully in that congested area. Also much detail that was not included in the smaller maps was shown on this, such as the positions of house connections, stop taps and every service pipe within that area.

"I see close to some of the service pipes a small purple figure. What does that indicate, Mr. Rodwell?"

"Each of these sheets has a corresponding card—which is housed in that filing cabinet over there—on which records are kept of all alterations or repairs carried out within that particular area. The sheet index letter gives the clue to the card itself; these small figures indicate the entry on the card dealing with matters relating to the portion of main or service pipe to which they refer. For the figure to which you are pointing, on turning up our reference card, shows that a reported shortage of water was found to be due to a defective service pipe which was repaired on

September 29th of last year by the insertion of 4 feet of new lead pipe of somewhat greater strength than the original one.

" All details as to time taken over the repair and the cost of the work as well as to the result achieved, which in this acse shows an increase of pressure of over 100 feet, are also denoted. This you will see is but a typical example."

" How is it that some service pipes appear to be shown dotted and others in full lines?"

" That is because there is often difficulty in tracing the whereabouts of old pipes, and until more definite information is obtained the full line is not used."

" I suppose you will have considerable difficulty in tracing these?"

" That is a fact; but by means of a small machine we have here this work is considerably facilitated."

Mr. Rodwell showed me the machine, which is called a pipe locator. It is enclosed in a polished oak box with a strap handle, and consists of dry cells and an induction coil, which can be used for transmission of wireless waves over a small area. It is for use only in cases where two points of the pipe are known. The working of this apparatus is best learned by example, so we took a test. A wire is attached to the nearest fire hydrant in the street, and the other end of the wire is fixed to one of the terminals of the instrument, and from a second terminal is taken a wire to the draw-off tap of the house service. The lost pipe completes the circuit, and so forms the outside fringe of a small " wireless " field. The make-and-break contact, or " buzzer," attached to the coil was set in rapid vibration, emitting a note, the pitch of which is capable of adjustment by means of a small thumbscrew. This adjustment is necessary as it is possible to confuse the note given by water-hammer or leakage in the pipe with the detector note of the instrument. I was requested to place the earphones on and listen. The magician waved a framework of wood and metal slowly forwards and backwards over the surface of the ground and asked me to let him know when the detector note grew loud or faded away. By working alternately the loudest and silent points we were able to trace the position of the pipe, which on trial was found to be correct both in position and depth to within one or two inches.

" Having found these pipes I suppose it would be necessary to take all particulars in order to make full records on all the plans? That seems a very laborious task, and will take a long while completing."

" Quite; but the Water Committee realise that it is all important that such records should be made, and have appointed a special draughtsman to perform those duties."

" In preparing these street plans showing all particulars relating to the Water Department, do you make separate copies for each of the inspectors and outside staff as well as for the permanent records which you have here?"

" Yes; four copies are made of each plan, all of them being exactly alike."

" Does that mean four separate tracings of the original?"

" No; that would prove too cumbersome a task. For that purpose we have a copying machine capable of producing the whole of the four within one minute. You will be calling in in the morning, so I will show you the machine then and explain it to you. Good afternoon, Mr. Bates."

" Good afternoon, Mr. Rodwell."

PART XIV.

" He shall drink of the water by the wayside and therefore shall he lift up his head." —Psalms.

If, twenty-five years ago, there had been placed in the hands of Nelson's schoolboys and schoolgirls a simple, plainly written and amply illustrated handbook giving easily understandable information showing how the town got its water, where that water came from, how it was stored up in reservoirs, filtered, sent through mains and service pipes and finally distributed to every house tap within the area, what a tremendous effect it would have made by now to the communal spirit and intelligence of the town.

Practical knowledge of that nature would have been far more useful to them than memorising the sanguinary deeds of gory-minded kings and rulers who had unfortunately lived and ruled but fortunately died and never done any good either to their subjects or themselves.

Useful data about so interesting a corporate undertaking would have proved more advantageous to them and to the town than cramming their innocent minds with the date when William the Conqueror landed at Hastings, and how he afterwards ravaged, burned, slew and steeped in blood a land that had never requested his professional butchering services nor desired him to share out among his hangers-on and court loafers land to which they had only a murderer's claim, but to which their descendants have stuck like limpets ever since.

If, twenty-five years ago, such a book had been provided for the children of Nelson, it would, by now, have helped in the solving of many of the town's most serious problems. Such a text-book would have greatly assisted in building up an enlightened manhood and womanhood and created within them a civic pride that would have raised the town to the highest pinnacle of communal honour.

Such a book would have affected Nelson's government in every phase and detail of its extensive undertakings.

I think such a book could be written, and that it ought to be written in the interest of the future good government of the town, and in words so homely as to make it acceptable to the scholars and teachers in every school in the district.

I am sure any teacher would rather impart knowledge of such a nature to children than

stuff their susceptible minds with the silly doings of hare-brained kings and queens who have—or ought to have—been dead and forgotten this thousand years.

Such were the thoughts that entered my head as I walked along Colne Road on my way to the Water Office, and I was more than ever convinced of the need for such a primer before I had finished my chat with Mr. Rodwell.

Arrived at the office, I found Mr. Rodwell very busy, so to save time he asked me did I mind being put in charge of one of his assistants. I was taken upstairs, re-introduced to Mr. Allan Booothman, who acts as Mr. Rodwell's assistant, and of whom I have very pleasant memories, and introduced to Mr. Herbert Varley, the head draughtsman.

In the interests of " Leader " readers Mr. Varley instantly and kindly consented to explain the copying machine and other matters in connection with Nelson's water supply.

This is the first time Mr. Rodwell has passed me on to a deputy; there was no help for it as at that moment important town's business called away both him and Mr. A. Boothman. Mr. Varley, as the soldiers used to say, " jumped to it," and acted the part of conductor as though to the manner born.

" This is the drawing office, Mr. Bates. It was originally a store room, but as you can see has recently been converted to its present use."

I wondered how long the room was, and in a moment Mr. Varley had the tape reel in hand, and bidding me hold the finger ring, ran the length and breadth of the room and said " 30 feet by 11 feet."

This room has plenty of windows admitting light, is well ventilated, the ceiling is boarded and varnished, and the walls painted a restful green. On the wall at the left of the entrance door is to be fixed a large cartoon map, 22 feet long by 10 feet deep.

On three sides of the office are mahogany top desks, and under the desks whole series of drawers. These drawers, which are dust proof, contain numerous plans which must have taken years to build up, arrange and classify, and are of invaluable importance to the Borough of Nelson.

In the long desk are fixed two glass panels, underneath is placed an electric light, which, striking the glass, makes for clearness and efficiency in preparing tracings.

In front of this long desk is fixed a wooden bar with a half inch space between. This prevents all large sheet drawings of maps and plans from creasing through being pressed against by the artist.

The two new desks and all the woodwork is the work of the Corporation joinery staff.

The office is lit up by electric light and is steam warmed. There are two telephones; one to Mr. Rodwell's office and an extension from the General.

After explaining all these things Mr. Varley led the way into the printing room. Pointing to a machine Mr. Varley said:

" This is the continuous electric photo copier. We take a print that has to be copied, put it behind a sheet of tracing paper and feed it into the machine. It moves round a cylindrical glass at a variable rate. The light is supplied by a powerful arc lamp sliding up and down the hollow shaft of the casing. The black lines on the tracing paper prevents the light from passing through, so that in the final development black lines are shown. When the print is taken out of the machine it is immersed in a tank of water for about ten minutes and then taken out and hung up to dry on this rack. It takes about half an hour to dry a print."

Mr. Varley was at some pains to explain the working of the electric motor which runs this apparatus. From this room my temporary guide took me into the various store rooms where all manner of spare parts, from a cistern to a tap-washer are kept handy for immediate use.

As we passed through the joiner's shop two of the staff were busy dining, and at the same time studying volumes of romantic literature. One of the twain had just got to chapter 13 of " The Villain of Grueby Grange," where " the villain, murder gleaming in his flashing eyes, hate hissing from his mouth, his teeth clenched in a spirit of spite, stood upon the edge of the yawning abyss. His left arm clasped the fainting heroine; in his right hand he grasped a blood-stained dagger, gore dripping from—." I could not tell what was about to happen, as that information was on the next page, and I didn't like to ask the man of shavings to " turn over."

Mr. Varley passed me over to Mr. John Lavis, the borough's oldest servant, who was anxious for me to see certain instruments, of which he has charge. " John " handles each one in turn with a fondness and gentleness quite paternal.

The first instrument he placed in my hand was a dipping needle. It is a delicate little thing enclosed in a brass frame; inside the frame is a dial with degrees of arc marked on it; in the centre, working on a compass pivot, is a magnetic needle, one half painted white, the other letter-box red. When not in use the needle is kept stationary by inserting a long, thin brass skewer through the frame, which in turn is fastened to the finger ring of the dipping needle by a slender brass chain.

This instrument is used for the finding of water boxes that have got buried by the constant accumulation of road metal over them.

The " dipper " is carried slowly over the suspected spot, and when the operator notices the red finger turn to " 6 o'clock," he knows that dead under where it points is the sought for box. The iron acting on the magnetic needle indicates the locality of the water box. This instrument, like the late Mr. George Washington, U.S.A., never has been known to tell a lie. It is often referred to colloquially as a " daylight lamp."

" You'd better have a look at our testing machine," said Mr. Lavis.

In a room upstairs stands this particular apparatus. It is a fulcrum and lever com-

bination. At one end of the lever is the handle, at the other end circular weights representing 300 lbs. Under the fulcrum is a cylinder. A tap to be tested is firmly fixed into position, the lever handle is lowered and raised three or four times; water, at a pressure of 300lbs. per square inch, is forced into the tap, and if it withstands that tremendous strain it is considered fit for active service, and, " joins up."

I think, though, that Mr. Lavis' pet machine is the depth recorder. This stands in a corner in the lower office, is worked automatically by a system of telegraphy from Waids House reservoir, and records day and night the rise and fall of the water there.

This machine, which looks a combination of galvanic battery, wireless set and pianola, is so delicately balanced in all its parts and so faithful a recorder of its appointed duties, as to enable Mr. Lavis, as it were, to feel the aqueous pulse of the town. By noting the dial he knows exactly how many gallons of water there are in Waids House reservoir. It measures water as carefully as a milkman measures cow-juice.

Afterwards, seated at Mr. Rodwell's desk, I remarked that Mr. Lavis had been showing me the test machine upstairs, at the same time explaining the intricacies and technicalities of testing brass and gun metal water fittings, and I was wondering if there was any recognised or universal standard to which these test were made?

" Yes," said Mr. Rodwell, " there is what is known as a British standard specification for all fittings; but the tests made here are on the pressures which the fittings will have to withstand in actual practice and are based on the maximum pressures obtaining in our area of distribution."

" Do you also test the pipes?"

" Not in every case. Cast iron and steel pipes are all tested before they leave the works, and we accept the inspector's certificate. But in the case of service pipes sample portions are taken from each consignment and tested to withstand the pressures in the zones in which they are to be used."

" This, I suppose, is quite a necessary precaution to prevent waste?"

" That is a fact, and is becoming increasingly important. These two sections of pipe here, which as you will see are 1½ inches long and ¾ inch and ½ inch in diameter respectively, have been cut off rolls of copper-lined lead pipe, and though they weigh only half as much per unit length as ordinary lead pipe they have been tested to pressures over 100 lbs per square inch beyond the bursting point of similar lengths of unlined lead pipe."

" Is that the very latest form of lead pipe used for service purposes?"

" Not quite. Here we have a section, which we are going to put under tests, of copper-lined steel pipe taken from a recent consignment of such pipe for work at the Coldwell filters."

" The steel portion alone seems very substantial. Would it not do without the copper lining?"

" Hardly so, as the steel would corrode under the action of soft water as supplied in this area, and the life of the pipe would be very short. The copper lining is a most suitable form of protection, assisting in the strength of the pipe, and not liable to be acted upon—as are lead and steel and, to some extent also, cast iron— by the water which has passed from either Ogden or Coldwell filters."

" As I look at these various samples, note their apparent strength and uniformity, it seems a far cry back to the days of wooden water pipes."

" It does. And yet there are some wooden water pipes actually in commission. This section here was cut from a piece of wooden main which was recently taken out of a London thoroughfare. Water from the old Clerkenwell passed through here probably for two or more centuries."

Mr. Rodwell handed me the section for inspection. Roughly speaking the outside diameter is approximately 12 inches, the inside, say, 6½ inches. It is elm, but whether common or Wych, I could not say. The bark has been stripped off, showing the form of the natural tree. Small pieces of grit and granules of sand are firmly embedded in the outside dents and cracks. The inside, which is very slightly cracked with age, still bears the thin film of deposit left by the passing water of centuries.

It looked to me that a tremendous number of elm trees had been grown and cut down to supply London and other towns with timber to be converted into water mains. The hollowing out process would be no light nor easy task; so I asked Mr. Rodwell how it was done. Said he,

" For the most part I believe a small boring tool was used and the hole made larger by being burnt out by means of red hot bars of iron, or possible by naked flame, as many of these pipes show signs of incineration."

" The length of each pipe could not have been great, nor, as trees do not grow true to a plumb line could each one have been exactly straight."

" The largest I have seen are from five to six feet in length; but I could not say whether they were used longer than these."

" How were they joined together?"

" One end of the pipe was tapered down and inserted into the end of the next pipe, which was shaped out to the necessary size. Frequently an iron band was placed round the socketed end of the pipe to prevent it splitting."

That section of wooden water pipe aroused my interest. I began to wonder what in the way of curiosities water engineers happened upon from time to time, and I am just trying to imagine what would happen if at the next meeting of the Water and Baths Committee Mr. Rodwell suggested a wooden pipe along Manchester Road!

" Have you any other nick-nacks or curios of general interest, Mr. Rodwell?"

" A few. Just step forward into this small laboratory; I think you will find one or two that will interest you.

This piece of lead pipe here is both very old and very soft and has been blown into its present twisted shape by a pressure of water not sufficiently strong to burst it."

The piece of pipe referred to was as crooked and distorted as Sir Harry Lauder's walking-stick. There was also a varied assortment of lead pipe cuttings showing the different thicknesses and textures of the material used. Some of these pieces had been gnawed by rats, others drawn asunder by the pressence of shifting ground; whilst in a number of vessels were sections of lead, copper and steel pipes immersed in water.

These items aroused the Dora Dartle spirit within me: so I asked, " What are these for, Mr. Rodwell?"

" When any new precipitant is used at the filters, the tests which you saw there do not necessarily point to the quality of the water delivered at this end of the trunk main, as a certain amount of chemical action might be taking place en route. Hence, not only do we make filtration tests at the filter house laboratory but also here, as you can see from the apparatus standing on the bench. But here we go a step further and test for any chemical action which may be set up by continuous contact with the various classes of service pipes employed, and these small test pieces are kept immersed in water drawn off in the town at various periods, these tests being carried out over a number of days."

" I suppose this is to prevent deleterious effect from the chemical action on pipes creeping in?"

" Yes; for example. It has been found that although a water may not be plumbo-solvent as it leaves the filters, it is possible, due to its contact (after having passed through a long length of trunk main) with naked pipes to find traces of lead, possibly so small as not to be injurious, and yet present just the same.

" That is one of the reasons for our adopting what you can see is a practical test; prevention, in this case, being better than cure."

" Then it is an extra safeguard to adopt a copper-lined pipe?"

" Yes; linings of either copper or tin have proved effective, although other protective measures have been used; notably among which are glass or enamel linings (for use in steel pipes only) or some form of bitumen or concrete lining, both of which have come greatly into favour within recent years."

Amongst all the test tubes, flasks, beakers, evaporating dishes, Bunsen burners and chemical scales, which go to make up the paraphernalia of a laboratory table I observed seven rubber stoppered Winchester quart bottles, the last four of which were connected in parallel, and through which a trickle of water was continuously running and varying in colour from deep brown to pale yellow.

I gazed, and beholding wondered.

" What is the import of this tiny array of bottles, Mr. Rodwell?"

" This is an experimental sand separator, the object being to find out what sand can escape from filters and be deposited in lengths of tubes or cisterns at varying points of flow."

" Ha! and that reminds me. I have often noticed after the mains have been shut off for repairs—which always seems to happen on washing day—on the water being turned on again there is sometimes to be found a sediment in the bottom of the wash basin. Is that fine sand brought down from the filters?"

" Very largely it is, as we find from samples which have been taken, but there is also an admixture of iron oxide, which coats the insides of mains and which being disturbed by the turning off and on of the water breaks away from its place of deposit and in minute grains is carried through the open water tap."

" At that rate the slight ferruginous deposit in our domestic water really constitutes a Harrogate Hydro tonic, ' an' all for nowt' ?"

" Quite so; though that latter point is not, I am afraid, medicinally appreciated by those who notice the colour in the water at such times."

" I have noticed on occasions a limey appearance in the water as it rushes through the tap. Is this due to some addition of lime or chalk at the filters? That is quite a common impression."

" Although those materials are used at the filters the white appearance you see has no connection with them; this appearance being caused by minute bubbles of air which become apparent when water is released from a high pressure. This you can prove for yourself by drawing a glassful and allowing it to stand for a few moments."

" Hush; mums the word; not another word about those bubbles, else future Water Rates might include something for ' fizz,' the genuine Ogden vintage, which, like the iron tonic, we are now getting free gratis and for nothing."

" Yes; someday I hope to collect and test the air so released as I am told there is a large proportion of ozone contained in it."

Iron, " fizz," ozone, in our tap water!

We'd better let it stop at that, else we might discover wealth untold in the soft rain that gently falls from heaven, detect a flashing pearl or diamond in every drop we drink, a broken rainbow in the little we may hold in the hollow of our hand, the glory of moonlight nights and fairy haunted pools in that with which we lave our faces, a starry poem and the secret of crystal springs in every tumblerful we hold between the eye and summer's sun.

We may see in the brimming beaker " all the devious brooklet's sweetness where the iris stays the sunlight "; we may hear in the fountain's splash music sweeter than ever trembled through the golden strings of æolian harp.

Water is of itself a jewel without price, and all the wealth our hearts can desire is not to be compared to it for value; it is life itself.

I shall long remember Mr. Rodwell's parting words. "You will find in the Book of Psalms one of the most 'telling' sentences in the whole book, "He shall drink of the water by the wayside and therefore shall he lift up his head.'"

Thoughts such as these we expressed to each other as we sat at the office desk, and we were reminded all too soon that the kettle would already be chanting its tea-time melody, whilst the invasion of office-cleaners further emphasised the necessity of bringing our chat to a close.

We had just time, however, to examine the geological maps, made up—like Joseph's coat—of many colours, the cases of books and filing cabinets loaded with statistical facts and figures; take a peep through a theodolite which was undergoing minor repairs and adjustment and make a cursory examination of the day-inspectors report sheets—these being some few of the impedimenta which are necessary for the transaction of the town's business of water supply.

But before leaving one must finally express thanks on one's own and on "Leader" readers' behalf to Mr. Rodwell for the useful information he has so willingly and generously imparted.

He has done a distinct service to the town and district.

PART XV.

"There was a secluded spring to which I sometimes went to drink the pure water, lifting it in the hollow of my hand.

Drinking the lucid water, clear as light itself in solution, I absorbed the beauty and purity of it.

I drank the thought of the element; I desired soul-nature pure and limpid.

When I saw the sparkling dew on the grass—a rainbow broken into drops—it called up the same thought prayer."

—R. JEFFERIES.

How often have I stood at the spring heads of the streams that rise on Pendle and flow into the great holders of Nelson's Ogden reservoirs. Away up amongst the purple heather patches, the wide bracken fields and the long whin acres, at all hours of day and night, at all seasons of the year and in all conditions of weather, I have passed pleasant hours watching the water coursing on its way from the high, chocolate brown peat beds, through pebbly pools, over mossy slabs and broken boulders.

I have stood where the water trickles out from under grassy ledge; I have followed it down, step by step, to where it enters the top reservoir in a torrent of lucent, sun-flecked, amber-tinted fluid.

In quiet thought I stand in those places now, listening, with intent ears, to the world-old song of water flowing, and seeing, with that "inner eye," each limpid, tinkling drop. I have followed those streams in winter time, when they were masses of solid ice, as grotesque in shape as a cathedral gargoyle, as wondrous in outline as a fairies' grotto, as glittering as a tiara of diamonds, as full of changing colour as April's landscape. I have stood by Pendle's pools when they were rimed over with a tracery of ice thin as a bubble, more delicate than old lace, fragile as a dragon-fly's wing and chased in cunning designs of fern, leaf, flower, tendril and wavy blade.

A breath, and the silvery pattern has melted; a finger touch and its silken brittleness has shivered into a thousand fragments.

Pendle, the hill that guards the town of Nelson, a hill more ancient than the snow-capped Alps and frigid Himalayas, gives liquid life to the thousands of men and women who live and work within its grey shadow. Its streams of clear water fill the town's reservoirs; their purity gives health to all who drink their hill-top clarity.

Our reservoirs are wonderful works of engineering skill. Up till recently their borders have presented one drawback; they have looked hard, harsh, stark, bare. Moorlands enclosed them on every side; great spaces barren as Alaskan wastes, forbidding in outline and aspect to all save lovers of the primal wild.

Of late years a new spirit has entered into our waterworks schemes. Barrenness is to be dispelled; the wild is to be made to blossom as the rose; the hard hill sides have to be draped with verdure of tree; the broken slope is to be adorned with "trees yielding fruit after their own kind," and instead of the swish of grass when the west wind blows, we soon shall listen to the whispering murmur of a hundred thousand trees.

Already Whitehough valley is taking on a new aspect. In twenty years from now, whether the contemplated reservoir be finished or not, that wide valley, packed with trees in rich variety, will be as lovely as any beauty spot in Lancashire.

It will be a place to be visited; it will be a study for the artist, a source of inspiration for the poet.

Should, by then, water fill in the long valley, the beauty of the vale will be still further enhanced. A thousand bending boughs, many draped in pink and snowy blooms, will gaze into the clear depths of an artificial lake to behold their virgin loveliness adoringly reflected.

Not Whitehough only, but Coldwell is to be beautified. Once again these places will become what we imagine they were in centuries past, forests of trees. They will in their prime provide for us new landscapes, delightful vistas, bosky scenes, new dreams, inspiring ideals.

This afforestation of our country side is a new departure in municipal enterprise. Once again Nelson is to the fore. Again the town

is leading the way that other boroughs may follow its example. It speaks volumes for those who have charge of this undertaking. It indicates a wide-awake committee, business-like workmen, careful foresters, and an alert Water Engineer.

Once started this corporation department immediately becomes an institution. Its offices must not be restricted; rather must they be extended.

One feels sure that the Water Committee, the Water Engineer and their staff have behind them the full weight of the whole moral support of the town of Nelson and every householder outside the borough whom they supply with water.

One is proud to be able to say one lives within this area, and drinks this district's clear water.

It is good water; the genuine Pendle Forest brew, than which there is no better vintage the wide world over.

De flumente in via bibet
Propterea exaltabit caput.

Psalm C.